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JANUARY 1992 • ISSUE NO.49
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NEW! FURNITURE BY THE ROOMFUL
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WOOD GOES TO FINISHING SCHOOL

HEARD ABOUT ACRYLIC WOOD?
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STEP-BY-STEP

HOW TO MAKE CABRIOLE LEGS

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- Quilt hanger
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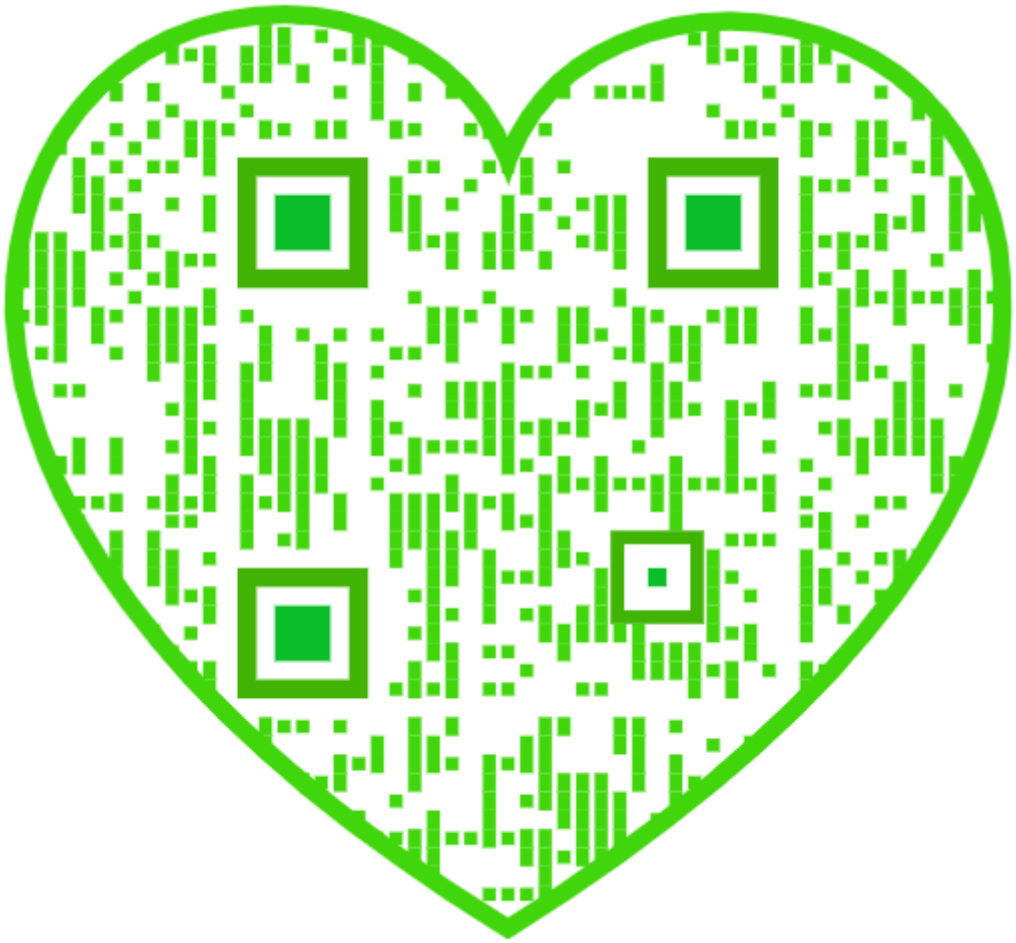

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THE EDITOR'S ANGLE

Something new for you...

A WOOD MAGAZINE F·A·M·I·L·Y HEIRLOOM PROJECT

FURNITURE BY THE ROOMFUL

Print this article

Changes just keep coming here at *WOOD*® magazine. First, we increased our production from six issues per year to nine, and added The Craft Shop section. In March, we published our first book, *335 Great Shop Tips,* and another one, *Favorite Toys You Can Make,* in the fall. And in November, we launched a new magazine, *Decorative Woodcrafts*™.

Now, we're testing the waters on a new service that may address a long-standing concern of ours. Every time we plan a furniture piece for you, we're faced with the same dilemma—"What's a person going to do with one piece of furniture that doesn't match the rest of the decor?" Sometimes, we've enticed you with design options, but that's not enough.

With *Furniture by the Roomful,* we're offering you additional, related plans tied to a how-to furniture project. Let me refer you to the Cabriole-Leg Coffee Table article on *page 42.* There we show you how to construct one of the most gracious coffee tables you'll ever run across. But that's not all. We also showcase three other projects—an end table, a hall table, and a footstool—all with nearly identical construction details. Only the dimensions change.

Although we don't have enough space in the magazine to do justice to all four projects, we have done the next best thing for people who want a roomful of beautiful Queen Anne-style furniture. We built all of the pieces in our workshop—as is our custom—to make sure we worked out all the bugs. Then, we turned over the projects to our technical illustrators who prepared a complete set of working drawings and a bill of materials for each. Expensive, yes, but it's the only way we know to get everything right.

If you're interested in ordering the working drawings for these marvelous-looking projects, see the box titled "More Queen Anne Furniture" on *page 44.* Drop me a note and let me know if you'd like to see more sets of furniture from us in future issues.

Larry Clayton

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This issue's cover wood grain: sycamore *Cover photo: Wm. Hopkins*

JANUARY 1992 ISSUE NO. 49

WOOD PROFILE
Sycamore: The ghost of the bottomland 23
This robust North American species once provided the wood for fur traders' canoes, manufacturers' crates, cigar boxes, and barrels.

CRAFTSMAN CLOSE-UP
Grand turnings on a small scale 25
Meet Washington state's Bonnie Klein, an enterprising woodturner who developed her lathe design and knack for turning miniatures into a successful small business.

CARVING
Hand-carved cookie molds 30
Make cookies the old-fashioned way with our cookie-board design, eight low-relief mold patterns, and Better Homes and Gardens® recipe.

SHOP-TESTED TECHNIQUES
Cabriole legs 34
Master the shaping of elegant cabriole legs by using our detailed step-by-step instructions and patterns. You'll be amazed at how easy it is.

NOW YOU CAN BUILD IT
Cabriole leg coffee table 42
Add a distinctive air to your living room with this striking Queen Anne cabriole-leg project. Or, better yet, build a roomful of the furniture (see our special offer inside).

***WOOD* magazine goes to finishing school** 46
Travel with Senior Editor Pete Stephano as he visits a Minnesota technical school to uncover the secrets of fine furniture finishing.

Acrylic-impregnated wood 50
Learn about a unique process to harden and preserve even the softest of woods for such projects as pistol grips and knife handles.

FAMILY HEIRLOOM PROJECT
Charming cheval mirror 52
Build this handsome full-length tilting mirror for your bedroom or some other room in the home, and then tip your hat to the able woodworker reflected in it.

TOOL BUYMANSHIP
Airbrushes 56
You can breeze through the finishing of spindles, slats, intricate pieces, and small projects with one of these under-appreciated applicators.

COLLECTOR'S EDITION™
Scratch awl . . . a craftsman's marking tool 58
The next time you need to scribe a line on wood or mark a screw hole, do it in style with this finely crafted hand tool.

THE CRAFT SHOP
Country quilt hanger 60
With this on-wall shelf project, you can display Grandma's colorful patchwork where the whole family can enjoy it.

Winter wonderland 62
You can almost feel Jack Frost nipping at the nose of the kids in this delightful 3-D scrollsaw scene.

It's a grand old flag 64
Salute Old Glory by crafting and painting a wall plaque of our beloved flag, using the full-sized pattern inside.

Simply stated Shaker wall clock 66
At the end of a hallway, or on a dining room wall, this timeless timepiece will surely attract its share of admirers.

SHORT-SUBJECT FEATURES

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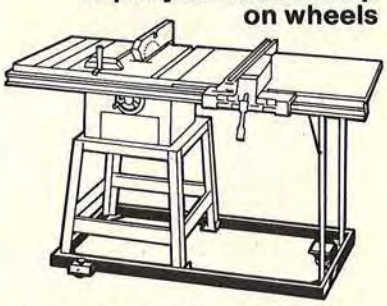

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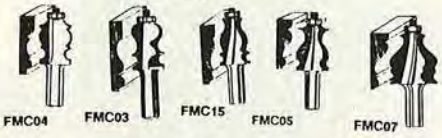

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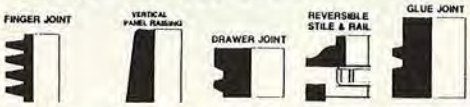

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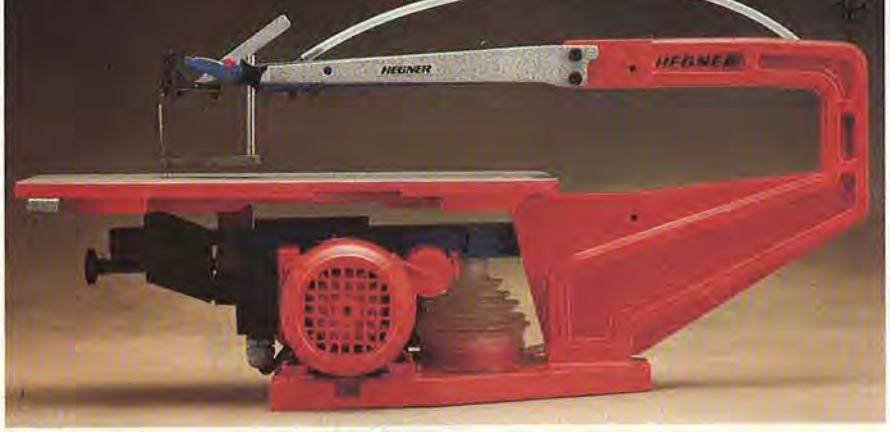

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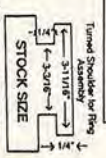

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TALKING BACK

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens® *WOOD*® magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

The shocking truth about old TVs

Thanks for a fine magazine. I received my October issue in today's mail and will be looking forward to the upcoming article on retrofitting TV cabinets. Many of our woodworking friends will not be aware of a *deadly shock hazard* that may await them inside those vacuum-tube TV receivers—even those that have been unplugged for an extended period of time.

—Darrell Stephens, Valparaiso, Fla.

Darrell, we are quite concerned about the hefty charge possibly residing in those tubes. When the retrofitting article runs, we plan to caution our readers to have the tubes discharged by a qualified repairman before starting.

Router jig redo

I just finished building my router jig from the October 1991 issue. I had no problems until building the stopblock. Your dimensions called for a ¼" hole drilled ⅜" deep. After I drilled it, I found the ⅜" hex-head bolt would not fit into that hole. I made another block, this time drilling a ⅜" hole ¼" deep, and it works very well. Keep the new jigs coming. I like to make them and see how they work.

—Fritz Marple, Pollock Pines, Calif.

Thanks for pointing out this error, Fritz. You're right. The hole in the stopblock should be ⅜" in diameter, ¼" deep.

The creator of *WOOD*'s nighttime skyline

The dramatic nighttime skyline used as a border background in the September 1991 issue for our craftsman close-up of Mario Rodriguez is the airbrushed handiwork of Mike Martis. We accidently omitted Mike from the credits.

Print this article

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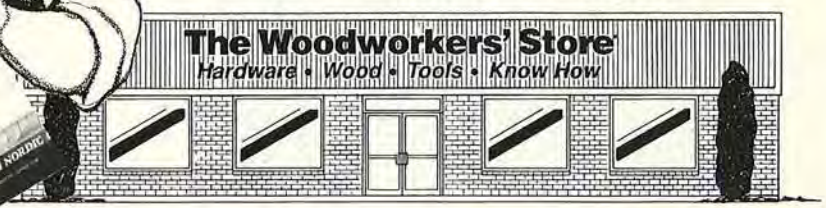

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Wanted: easy projects

I am a 66-year-old retired widower. Your magazine seems to be aimed at the professional and semi-pro craftsman, rather than beginners such as me.

I drip with envy when I see all the fancy expensive tools, the woods and materials, the skills and knowledge, the spacious work space, and the finances required to support some of your projects. You see, I possess none of the above. Yet I love the feel and smell of lumber and sawdust. There must be at least two or three other guys out there in the same boat that would appreciate an occasional project devoted to newcomers with a few tools.

—Ron Thompson, Chino Valley, Ariz.

More scrollsawed letters

Among the many scrollsaw lettering guides we sell at SEYCO is one that should satisfy reader John Bradley. He inquired in the September 1991 Ask *WOOD* about a signmaker's alphabet where letters like "p" and "q" don't dip below the baseline. To order our sturdy plastic 2"-lettering guide for our sale price of $33.75 ppd., call 800/462-3353 and ask for item RST 009.

—Ray Seymour, Garland, Texas

Sanding-sleeve source found

I finally found a source for a 2¼×3" sanding sleeve, and thought I'd share it with you. Old Atlas, Delta, and Sears drill-press attachments take sleeves this size. You can order from The Sanding Catalogue, P.O. Box 3737, Hickory, NC 28603-9928.

—Lewis Bernard, Ely, Minn.

Return of the Router Crafter

The Sears Router Crafter is back by popular demand after a 5-year absence. Driven by customer letters—we got some ourselves—Sears says the Router Crafter should be in its larger stores this month for less than $100. Use it with most 6"-base routers to perform several furnituremaking functions usually done on a lathe. These include the making of straight or tapered spindles with beading, fluting, and left- or right-hand spirals.

Scrollsawers like carving patterns, too

You carve them and I'll scrollsaw them. The "Nature's Goodness" wall plaque (August 1991) was great. I used ¾" fir with a ¼" plywood back, and added plywood to the fir for levels of relief.

—A. Kampman, Naperville, Ill.

Continued on page 8

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TALKING BACK

Continued from page 7

Another vote for retrofitting TV consoles

I had just completed a TV-cabinet project of my own when I noticed your October 1991 Editor's Angle on retrofitting new sets into old consoles. My fun project just didn't seem to last long enough. I used a 1959 oak Admiral floor console. I replaced an old 23" black and white unit with a new 25" color set. Using a router and a rotary power tool, I shoe-horned the new set right into the cabinet.

—Jim Ross, Linthicum, Md.

Should you boost cutter speeds?

In your dado-cutter tests (October 1991), you omitted one important factor in getting smooth dado cuts—*speed.* To counter reduced tooth speed when using smaller diameter blades, I installed a 3-step pulley on my motor. When using the 6" dado, I move up a step. I go up another step when using my 4" molding-head cutter for nice smooth cuts.

—Frank H. Flores, Ida Grove, Iowa

Interesting idea, Frank, but our project builder, Jim Boelling, warns against using molding-head cutters, dado blades, or saw blades at speeds exceeding the manufacturer's recommendations. Boelling once was hit in the mouth when the carbide tip flew off a top-quality saw blade he was using.

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—Jim Brewer, Freud research and marketing manager

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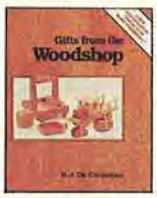

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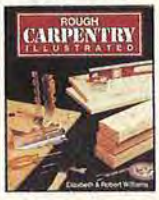

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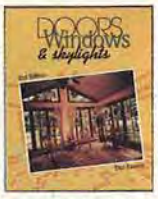

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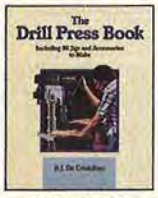

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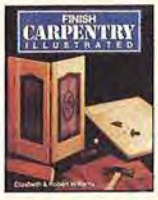

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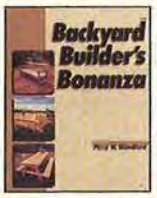

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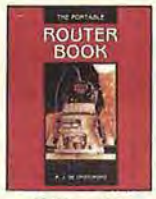

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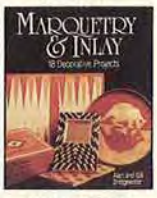

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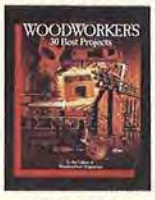

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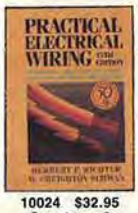

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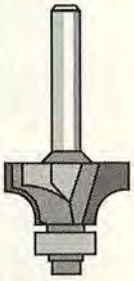

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C1185	1-1/8"	1/2"	2-3/8"	5/16"	$12.00
C1186	1-1/4"	5/8"	2-1/2"	3/8"	$14.00

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PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	SALE!
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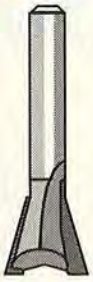
C1002	5/16"	11/16"	2"	$6.00
C1003	3/8"	3/4"	2"	$6.00
C1004	1/2"	3/4"	2"	$8.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	SALE!
C1008	1/4"	3/4"	2-1/2"	$6.00
C1009	5/16"	3/4"	2-1/2"	$6.00
C1010	3/8"	3/4"	2-1/2"	$6.00
C1011	1/2"	1-3/16"	2-1/2"	$8.00

Dovetail Bits 2 Flutes



1/4" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	ANGLE a	SALE!
C1068	3/8"	3/8"	1-3/4"	8°	$5.00
C1069	1/2"	1/2"	1-3/4"	14°	$5.00
C1071	3/4"	11/16"	2-1/8"	14°	$7.00

1/2" SHANK

PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	ANGLE a	SALE!
C1074	1/2"	1/2"	2-1/4"	14°	$5.00
C1076	3/4"	7/8"	2-1/2"	14°	$8.00

Chamfer Bits 2 Flutes

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PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	SALE!
C1129	1"	7/16"	2"	$12.00
C1130	1-3/8"	5/8"	2-1/4"	$16.00

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PART	CUTTER DIA. A	CUTTING LENGTH B	OVERALL LENGTH C	SALE!
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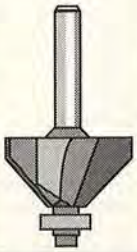
C1132	1-3/8"	5/8"	2-3/8"	$16.00



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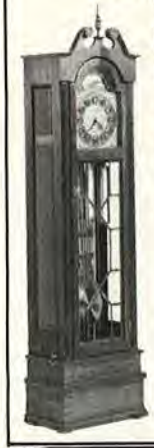

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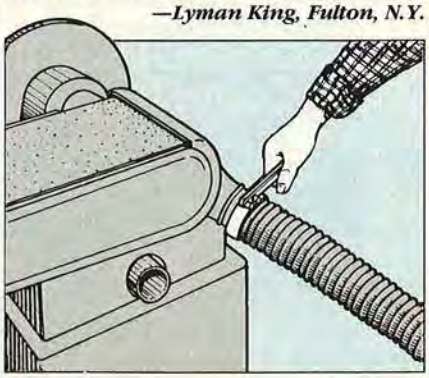
Filter wrench speeds dust-hose changeovers

Switching your dust-collection hose from one machine to another annoys you. Tightening and loosening the hose clamp with a screwdriver eats up a lot of time.

TIP: Instead of a hose clamp, try a band-type automotive oil-filter wrench. It slides right onto the end of a 3" hose, and then you can connect or disconnect the hose with just a flip of the wrench handle.

—Lyman King, Fulton, N.Y.



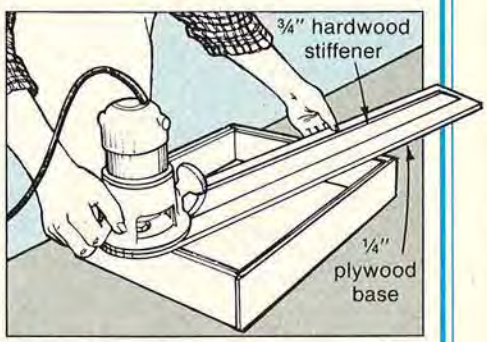
Long arm lends hand when routing edges

You can't rout assembled box or drawer edges very well, especially inside edges, with a handheld router. The narrow edge doesn't support the router properly, so you end up with a poor cut. A table-mounted router does the job, but what if you don't have one, or the work is too cumbersome to handle on a table?

TIP: Build an extended base for your router from ¼" plywood and ¾" hardwood, shown *right*. The plywood width should equal your router-base diameter. Make it long enough to span your project.

Round one end using the router base as a template, and mark the mounting holes and router-bit opening. Then, drill the opening for the router bit. Drill and countersink the mounting-screw holes. Cut the hardwood stiffening spine, and then glue and screw it into place. Mount the router to your new extended base, and you're ready to tackle those outside or inside edges with ease.

—Ken Seals, Edenton, N.C.



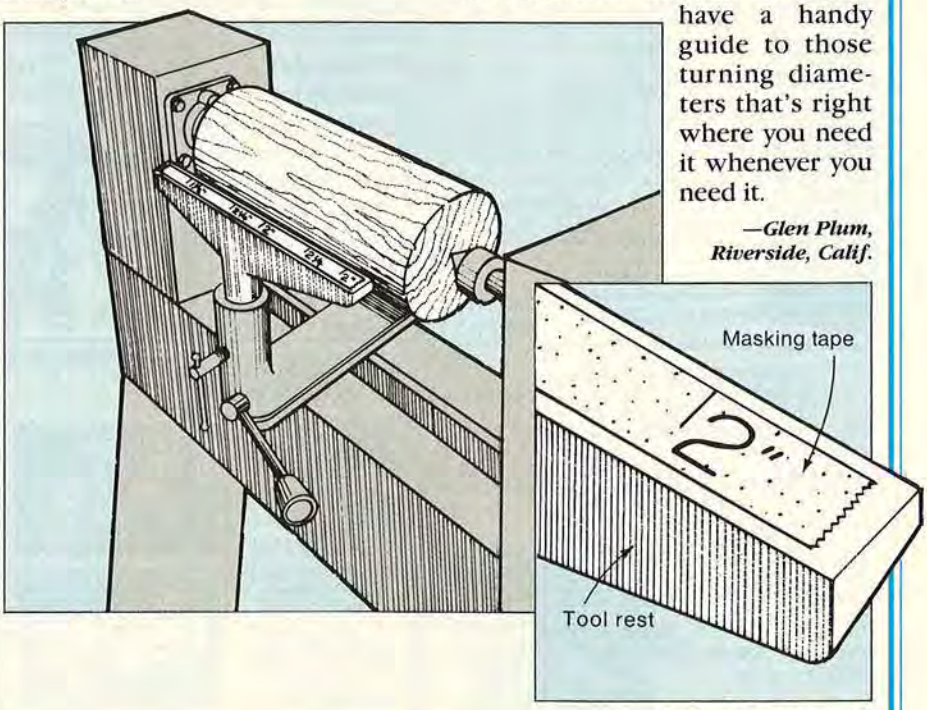
For his tip, Ken receives this Dremel model 1371 13" scrollsaw.

Tape records diameters for woodturning layout

Constantly referring to templates on small turning projects slows things down, but you do need to know diameters at various reference points.

TIP: When you set up for a turning, put a strip of masking tape along the top of the lathe tool rest. Mark the reference points and diameters onto it. Now, you have a handy guide to those turning diameters that's right where you need it whenever you need it.

—Glen Plum, Riverside, Calif.



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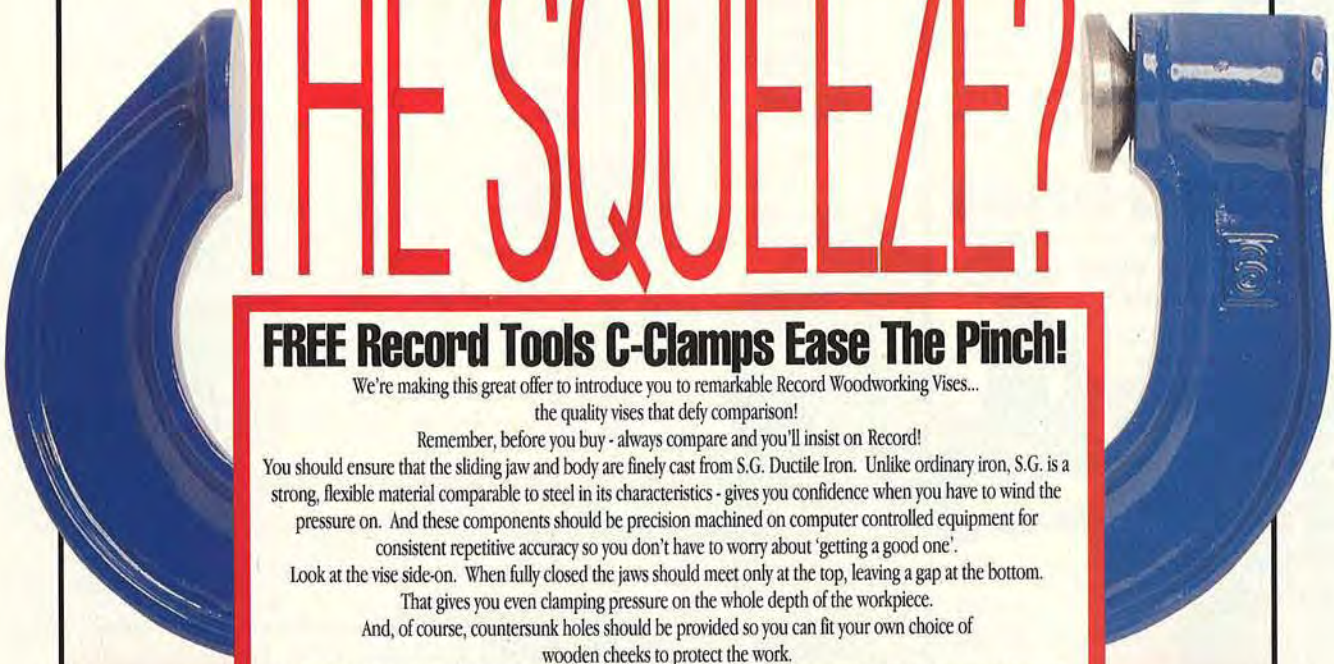
FEELING THE SQUEEZE?



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And, of course, countersunk holes should be provided so you can fit your own choice of wooden cheeks to protect the work.

The steel main screw should have a buttress thread and quick-release trigger mechanism. This disengages the main screw allowing the jaw to slide freely - saves a lot of time if you're working with different widths of stock.

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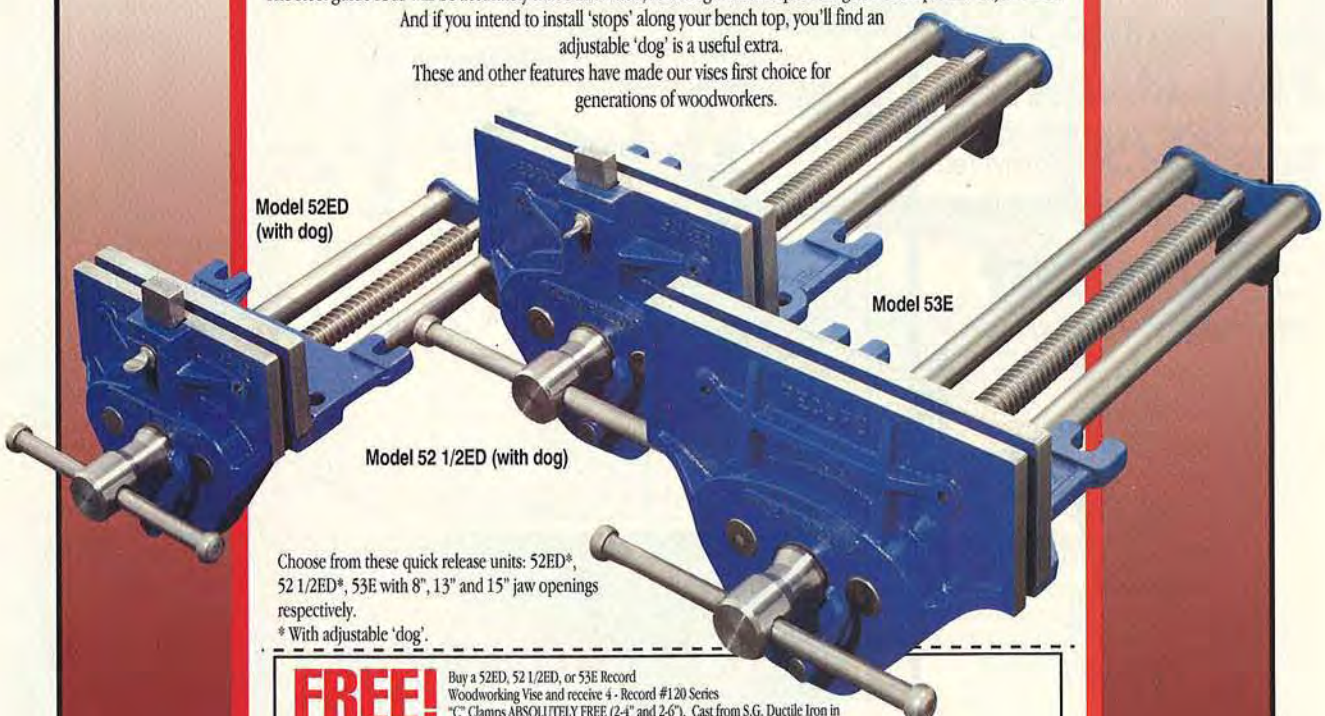

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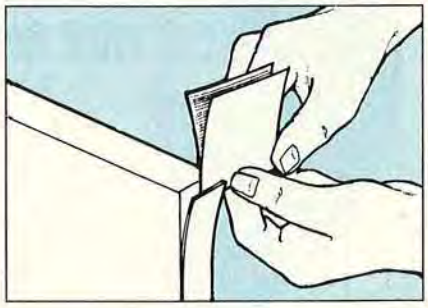
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 12

Paper slips glue into tight spot

Veneer edging has a habit of popping loose. The only answer is to deposit some glue behind it and stick it down again. But some edging isn't very flexible, and you run the risk of breaking it if you try to bend it far enough to get your glue-bottle tip in. What's a woodworker to do?



TIP: Fold a piece of notepaper in half and give it a sharp crease. Put a few drops of glue into the crease near one end, and slide that end in behind the loose veneer. Now, you can squeeze the glue out of the paper as you press the veneer back into place. You'll have your edge back on without getting glue all over or breaking the band.

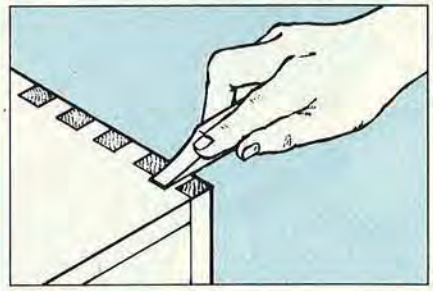
—Brian Breshears, Kent, Wash.

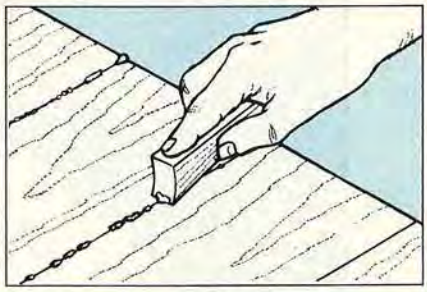
Smooth on the filler with a shop-made tool

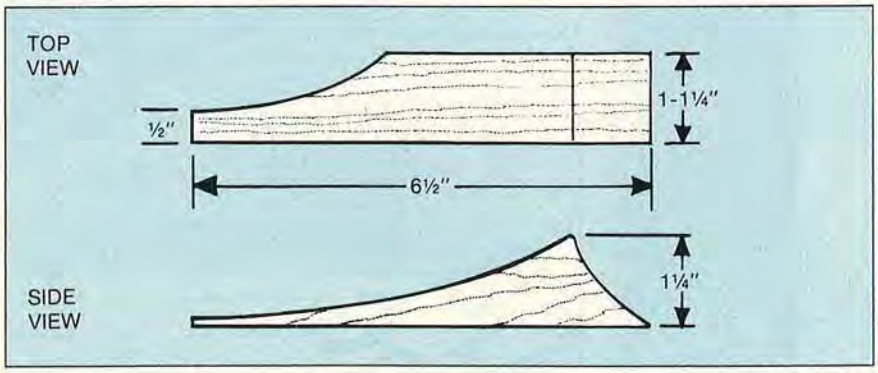
Sometimes you have to use wood filler, but putting it on with a putty knife leaves something to be desired. Putty knives always seem to be the wrong size, or the metal blade scars your wood.

TIP: Make an applicator from scraps of hardwood from 1″ to 1¼″ thick. Cut a wedge-shaped piece as shown in the side view *below*, and sand the thin end to width with a drum sander. Apply filler with the long, tapered end of the applicator, and remove the excess with the opposite end. If you don't get the filler cleaned off your applicator before it sets up, just sand down to a new surface.

—Stan Thomas, Bend, Ore.







Continued on page 17

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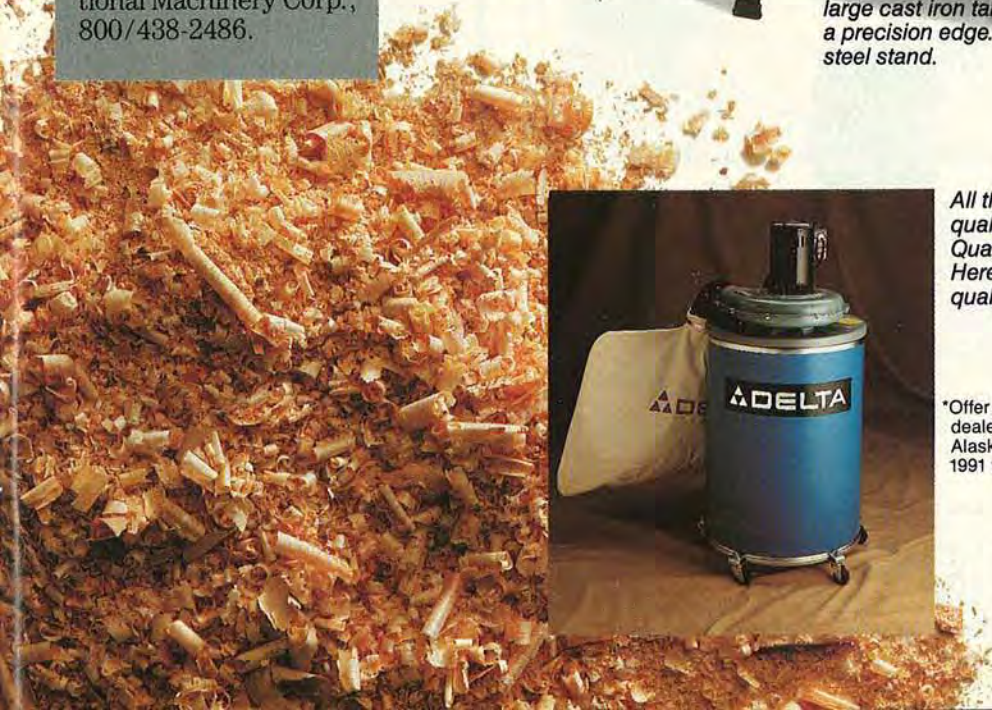

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 14

Add a bit of color for safe jointing

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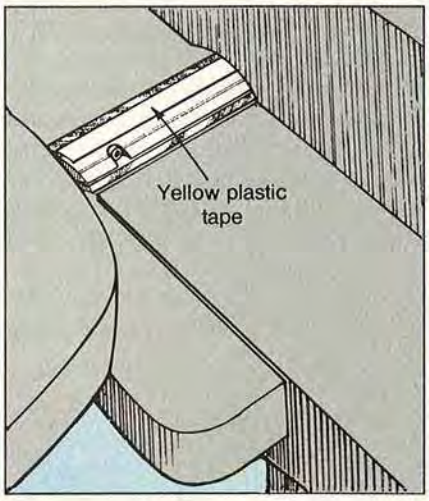
TIP: Stick strips of yellow plastic tape to the cutterhead between the blades. Then, whenever you see a flash of yellow between your workpiece and the guard, think of the knives. Unplug the machine and clean the head before applying the tape.

—Harold Thomson, Raytown, Mo.



MORE TIPS FROM OUR WOODWORKING PROS

- For a way you can laminate stock and trim it to size to make furniture squares, check out Step 1 on *page 42*.
- Does cutting perfectly round corners give you fits? See how we cut the radius with a drill bit and then make straight saw cuts up to it. It's on *page 42*.
- Want to make some raised-panel doors? See the photos on *pages 67* and *69* showing how we made the tenon-and-groove front frame for our Shaker clock. The same article describes making a raised panel to fit the frame.

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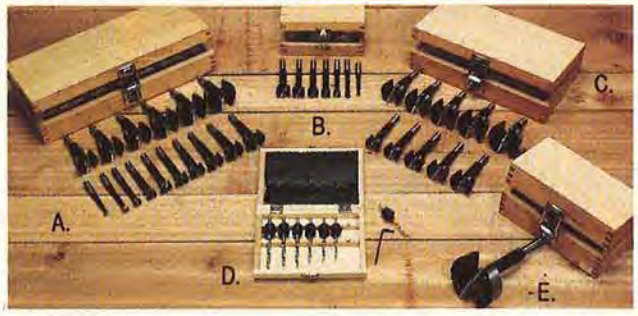

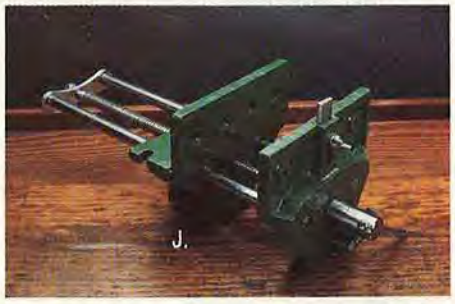

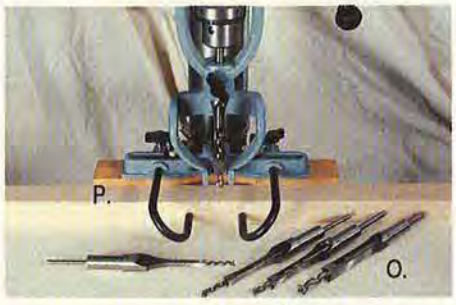

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MORE GREAT TOYS FROM

◀ TURN OUT THE BARREL
An endless stream of wooden cars, trucks, and boats pour out of Henry J. Gorczynski's workshop in Batavia, New York. His craftsmanship on this cement truck won him the "best truck" citation in the professional division. The walnut body contrasts well with the turned, laminated maple and walnut barrel. Not an easy win in this entry-filled category.

Shortly before the Marines arrived to load up the Build-A-Toy entries for distribution through their Toys-For-Tots program, the urge to share got the better of us. So, we called one of our trusted photographers to shoot a few selected projects. And as you can see, all of the woodworkers represented here—both winners and nonwinners alike—did a super job.

Wonderful wooden toys

Here's the lowdown on the grouping of toys in the photograph, *below.* In the back row, at *left,* you see the marvelously detailed road grader built by Steve Roberts of Dunmore, Pennsylvania. A favorite among *WOOD*® staffers, it claimed the "best use of wood" award for hobbyist class.

Although hobby woodworker Monte Norton, stationed at Michigan's Sawyer Air Force Base, didn't walk off with a prize, we liked his oak front-end loader. Next to it, we parked Brian Rebella's bulldozer that took "best finish" in the hobbyist division for the Mellen, Wisconsin, craftsman.

Print this article

OUR 1991 BUILD 'A-TOY CONTEST

And, to its right, stands the elephant pull toy made by Ray Ellis, of Rustburg, Virginia.

Gary Mace's American coaster wagon was a superbly crafted piece. Gary, though, went beyond the contest's size limitations. But a nice job, anyway, Gary.

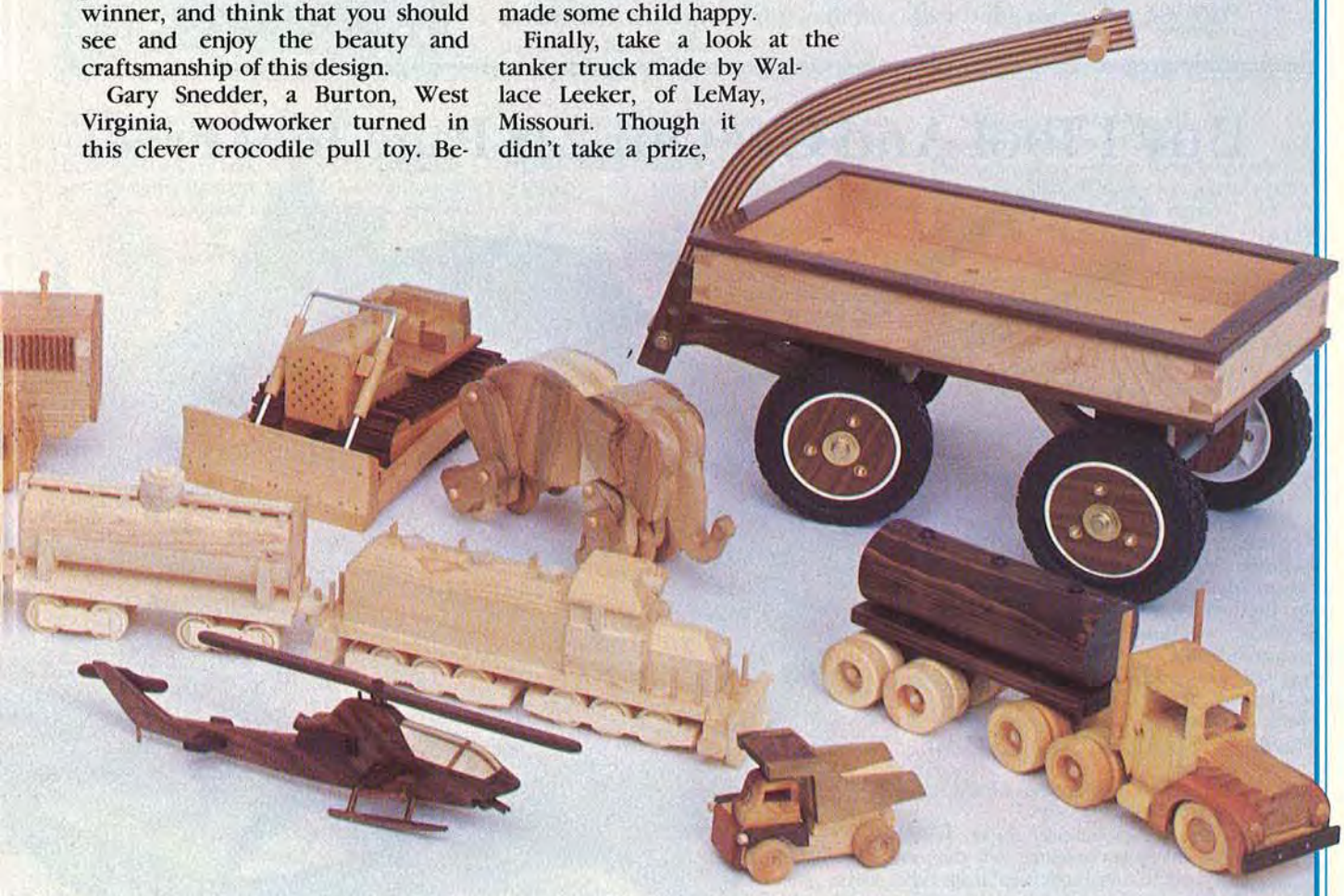
The vintage stake-sided truck in the first row was sent in by Tom Quinn of Colchester, New Jersey. Although it didn't take home a prize, we definitely think it's a winner, and think that you should see and enjoy the beauty and craftsmanship of this design.

Gary Snedder, a Burton, West Virginia, woodworker turned in this clever crocodile pull toy. Behind Gary's croc is the train made by Carl Boop, of Levittown, Pennsylvania. It took "best train" in the professional division.

Steven Bruni, a professional woodworker living in Fort Madison, Iowa, crafted the walnut Huey Cobra helicopter. For his trouble, he was awarded "best finish." The tiny truck beside the chopper was built by Harry Yager, who lives in Midwest City, Oklahoma. It didn't win, but it still made some child happy.

Finally, take a look at the tanker truck made by Wallace Leeker, of LeMay, Missouri. Though it didn't take a prize, this and 12 other toys mailed in by Wallace brought smiles from a whole truckload of lucky youngsters. Great job!

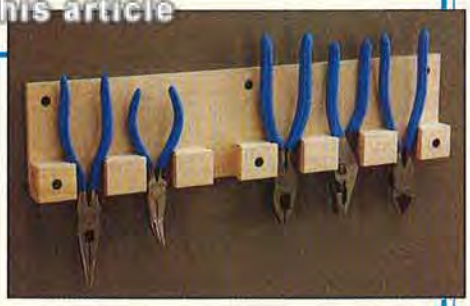
▲ FIGHTER DOES A FLYBY
In the professional division, Joseph Pasquito, a Lawrenceville, New Jersey, woodworker won the "best use of wood" citation with his maple and walnut jet fighter. (It's an F-14, we think.) It led a squadron of other entries.

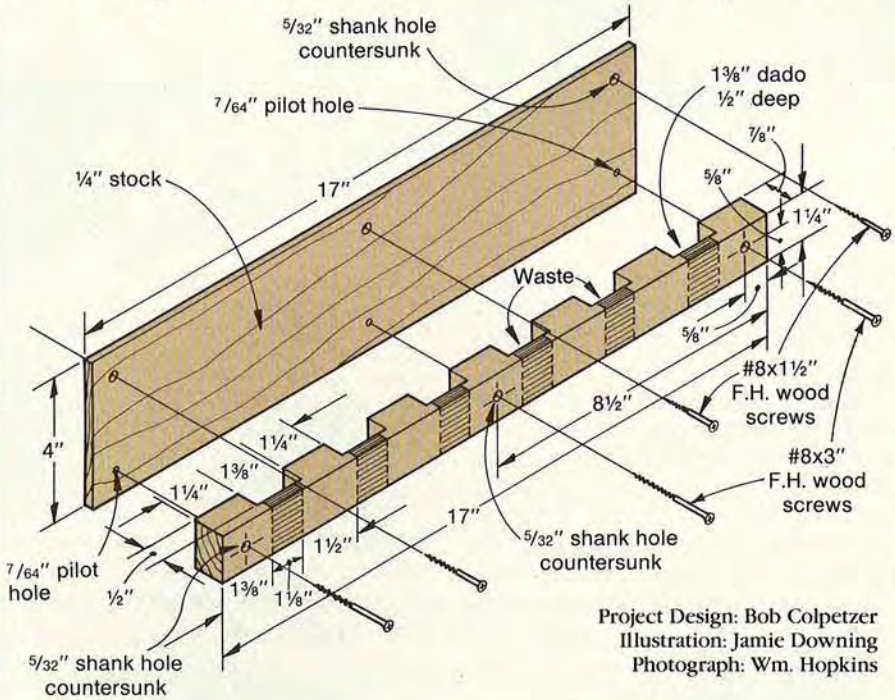


Photographs: John Hetherington

Print this article

Handy home for a family of pliers





Project Design: Bob Colpetzer
Illustration: Jamie Downing
Photograph: Wm. Hopkins

With this nifty, wall-hung organizer, you'll know exactly where to find those bent-nose pliers—or any others—the next time you need them. To build the maple rack, cut the front and back pieces to the sizes shown on the drawing. (We resawed 1 1/16"-thick stock for the ⅞"-thick front piece.) Cut the 1⅜" dadoes ½" deep in the back side of the front piece where marked on the drawing. Glue and screw the two pieces together, flush along the bottom edge. Then, cut the waste (shaded areas) away from the front piece where shown.

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CACAO

A TREE FOR CHOCOLATE LOVERS

Montezuma thought chocolate gave him wisdom.

When 17th century Swedish botanist Carl Linnaeus named the chocolate tree, he pulled out all the stops. The word *Theobroma,* its genus, translates to "food of the gods." Its species name, *cacao,* describes the product derived from its beans. And now, chocolate lovers, the rest of the story.

It seems that Hernando Cortes and his soldiers witnessed a strange ceremony while among the Aztecs of Mexico in the early 1500s. Emperor Montezuma, considered a living god by his subjects, sat sipping from a golden chalice. Each time it touched his lips, the crowd hushed. The dark brown, bitter *chocolate,* the Spaniards were told, brought him wisdom because it came from beans originating in paradise.

Actually, the beans came from large pods produced by a short hardwood that grew throughout the region. The Indians occasionally used the tree's reddish brown wood for rough construction, but its beans were so valuable that the natives turned them into currency—four bought a wild turkey, 100 a slave.

Soon, the explorers had collected a supply of beans to take back to Spain. They also took a special recipe discovered in a sanctuary. The recipe sweetened the bitter bean brew with sugar and vanilla. By the mid-1500s, the new cocoa was the European rage. The English and Dutch added milk and established chocolate houses to serve devotees. In adopting the stimulant, the French proclaimed it an aphrodisiac.

Today, the beans of the cacao tree still yield the basic ingredient for chocolate, as well as cocoa butter for soaps and toiletries. And that *is* the rest of the story.

Illustration: Jim Stevenson

D / "Hot Stuff" Is Great Stuff For That Quick Fix In Woodworking

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SYCAMORE

Ghost of the bottomlands

Fur trappers and traders plying Mississippi River tributaries in the 1700s didn't look far for canoe stock. The massive, bone-white trunks of the native sycamore—the preferred material for their huge dugout vessels—stood out like ghosts from other trees lining the waterways. And often, nature had already performed much of the work, partially hollowing the trunks by decay.

The sycamore easily met the size requirements for trade canoes that frequently measured 65′ long. That's because among hardwoods, the sycamore is the hands-down winner for immense proportions. The largest known example in the United States shades a yard in Jeromesville, Ohio. It stands 129′ tall, measures 15½′ in diameter, and has a 105′ crown spread.

In addition to sycamore's early use for canoes, the wood offered sound stock for cooperage and crates, tobacco and cigar boxes, butcher blocks, and saddletrees. And luthiers found quarter-sawed sycamore perfect for the backs and sides of fiddles and other musical instruments.

Wood identification

The most widespread of three native sycamore species, the American sycamore (*Platanus occidentalis*) appears in rich, moist bottomland soils from Kansas to the Atlantic Ocean. Variously called planetree, buttonwood, and buttonball-tree, sycamore seldom grows in stands, but intermingles with other lowland hardwood trees.

In the best of conditions, sycamore attains 100′ heights and diameters upwards of 10′. The area umbrellaed by the tree's spreading crown sometimes matches its height. And the trunk may be branch-free for 60′!

You'll never forget the sight of a huge sycamore tree. The trunk, haphazardly exposed in areas by peeling bark, looks eerily white. The upper branches usually entwine at angles. The large leaves—often 10″ wide—have a shiny green top surface and a pale undersurface. By fall, sycamore's fruit shows up—fuzzy seed clusters called buttonballs.

Sycamore's coarse-grained wood has a pale reddish cast. Interwoven fibers give the wood hardness and elasticity, but at the same time, make it difficult to season when flat-sawed. Quarter-sawed sycamore displays an attractive fleck pattern in the grain. At about 35 pounds per cubic foot air dried, the wood matches cherry in weight.

Natural range

Uses in woodworking

Manufacturers of boxes and crates use the largest share of sycamore because it is strong, has no odor, and imparts no taste. In the home workshop, properly seasoned sycamore shapes up as a tough utility wood for frames and cabinet carcases. As unfinished drawer sides, the wood actually becomes smoother and slides easier with use. And quarter-sawed, it can become attractive furniture. Its rayed grain also makes impressive turnings.

Availability

Large hardwood dealers catering to commercial accounts, and sawmills located within its range, will likely carry sycamore. To take advantage of grain pattern, much sycamore becomes veneer. Lumber should cost less than $1 per board foot, and veneer 30 cents per square foot.

Continued

PERFORMANCE PROFILE

sycamore

(Platanus occidentalis)

Plain-sawed sycamore

Improper seasoning methods and an overly hasty kiln-drying schedule result in stained and warped sycamore. Processors familiar with this wood, though, produce uniformly colored, durable, stable stock. So, shop before you buy.

Machining methods

Sycamore reacts to machining or hand tools almost like cherry, but in some instances matches maple's annoying tendency to burn. *Any problems or unusual handling are noted in the following tips:*

- Sycamore planes and joints easily, but has a moderate blunting effect on cutting edges much like maple. Figured or quarter-sawed stock requires shallower cuts and a slow feed rate.
- Because sycamore lacks the stiffness of cherry, it isn't as likely to break out or chip in crosscutting. Ripping straight-grained stock poses no problems, even without carbide-tipped blades. Avoid tearout in quarter-sawed or figured wood by leaving enough for a jointing pass to clean the edge after sawing.
- Sycamore routes readily. Figured or quarter-sawed stock may burn more readily than plain stock, so maintain a consistant feed rate without forcing the bit through the wood.
- Drilling at medium speeds produces clean holes with no breakout. Lift the bit occasionally to clear debris. This technique avoids burning.
- Sycamore sands effortlessly to a glasslike finish, and, if left unfinished in a project, such as drawer parts, for example, it will actually burnish itself smooth.
- All adhesives work well on sycamore. And because the wood resists splitting, pilot holes aren't required, unless you seat screws by hand.
- Plain-sawed sycamore without figure stains well and accepts any finish. It's easily dyed to any color. Before staining figured or quarter-sawed wood, test the stain on scrap for even penetration. A wood conditioner may be required in some cases to avoid blotchiness.

Carving comments

For unknown reasons, sycamore rarely shows up in carvings, although it isn't as hard as cherry and can be carved with chisels and a mallet or power-carving tools as easily.

- The grain flecks caused by the wood's rays make it ideal for clear-finished sculptural subjects where they would add visual interest. However, they would detract from a detailed carving unless paint were used.

Turning tricks

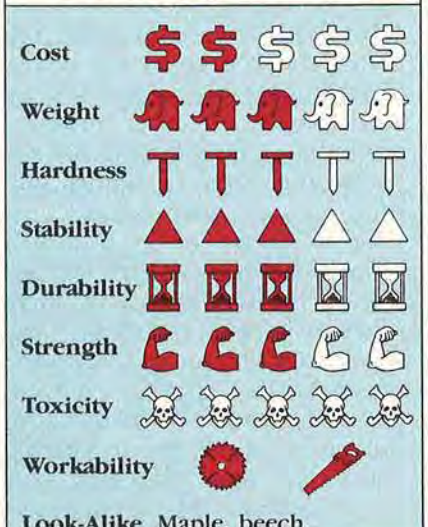
Except for its slight tendency to dull tools, sycamore turns exceptionally well, producing smooth turnings that require little sanding. An excellent choice for between-centers work, such as spindles and balusters.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and special tips pertaining to this issue's featured wood species—appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board.
- Drill pilot holes for screws.
- Rout with sharp carbide-tipped bits and take shallow passes to avoid burning.
- Carving hardwoods like sycamore generally means fairly shallow gouge bevels—15° to 20°—and shallow cuts.

SYCAMORE AT A GLANCE

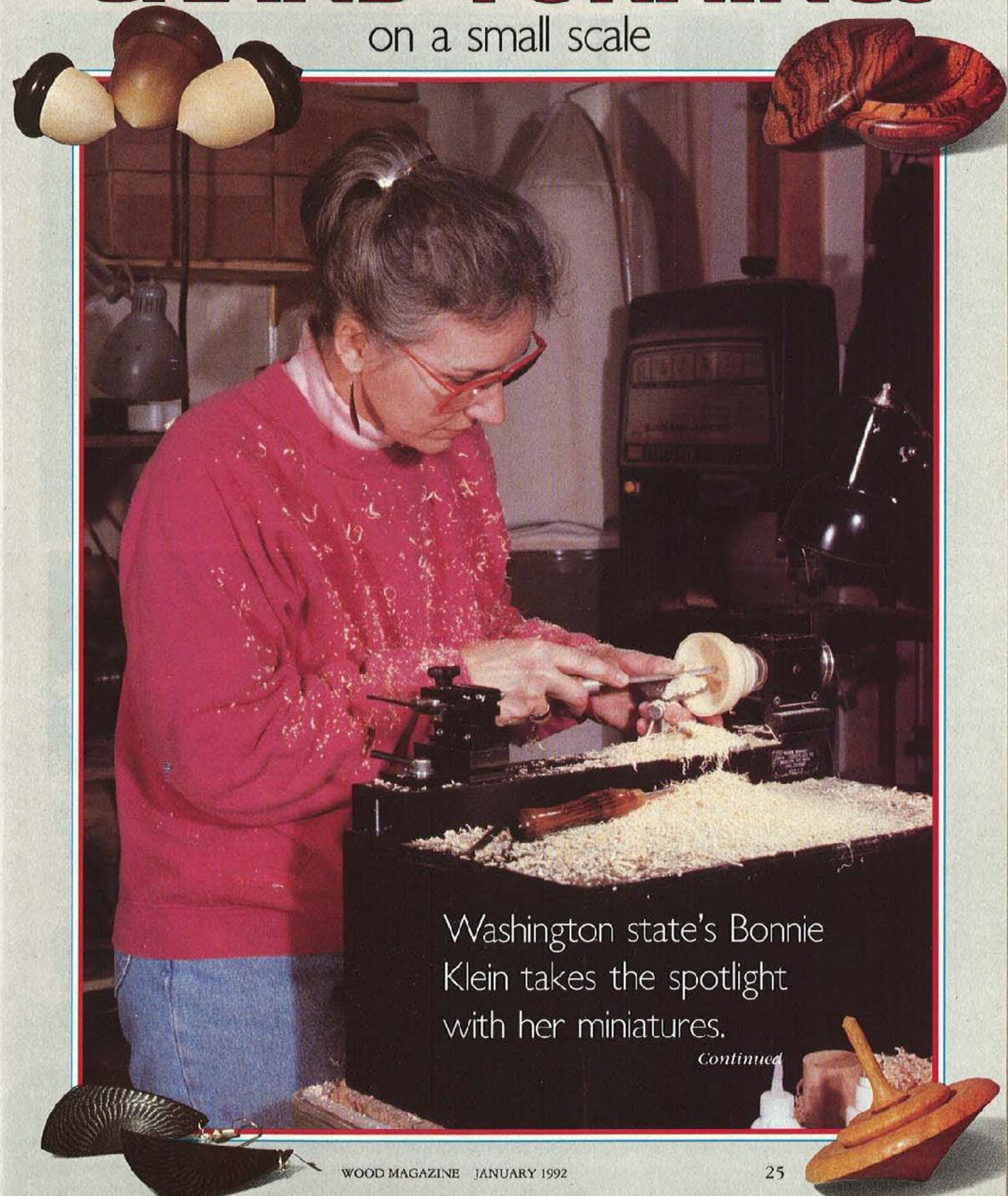


Look-Alike Maple, beech.

Compiled with woodworkers Vern Cusban and Jack Stiles Photograph: Hopkins Associates Illustration: Steve Schindler

GRAND TURNINGS

on a small scale



Washington state's Bonnie Klein takes the spotlight with her miniatures.

Continued

GRAND TURNINGS

Print this article

Bonnie Klein knows woodworking. She grew up on Mercer Island, Washington, her dad a home builder. At his job sites, Bonnie played at hammering and sawing away on scrap lumber. "I would love to have taken woodshop in high school," says Bonnie, "but girls weren't allowed. The closest I could get was mechanical drawing."

"I've always enjoyed working with my hands, even in domestic things," she adds, "such as sewing, and the crafts of weaving and basketry." It was woodturning, though, that eventually held Bonnie's interest. That was about 18 years ago, when her son was in junior high shop class. "I got inspired by watching a Shopsmith demonstration," she recalls. "After that, I tried to find instruction. Back then, that was difficult. I did, however, eventually manage to turn a set of napkin rings—it took me six weeks!"

Today, Bonnie Klein, 48, has produced four videotapes covering her special brand of turning. She also teaches at seminars and workshops, and markets her own lathe and turning tools. At her home in Renton, Washington, we found out what makes Bonnie tick and discovered firsthand the joy of turning tiny items of value.

The sweet smell of burning pine wafts through the room. From the fireplace, the radiating heat warms the shop. Flickers of firelight brighten the tiny objects near the lathe—ivorylike covered boxes, shiny metal goblets, bowls and jars, an assortment of colored tops—Bonnie Klein's trademark turnings.

"I've gained a reputation as a miniature woodturner," says Bonnie, looking up from her lathe. "But I've been trying to step away from that a little bit because the lathe I've designed not only is great for miniatures, but all small-scale turnings—earrings, bracelets, and other jewelry, letter openers, pen bodies, you name it."

She pauses, her eyes aglow with an emerging thought: "No matter what someone turns, woodturning is really therapy. You put a piece of wood on the lathe, then do the shaping, the finishing, and when you take it off, it's done. The lathe stands alone as a tool like that. It appeals to people for the same reason as fast-food restaurants—instant gratification."

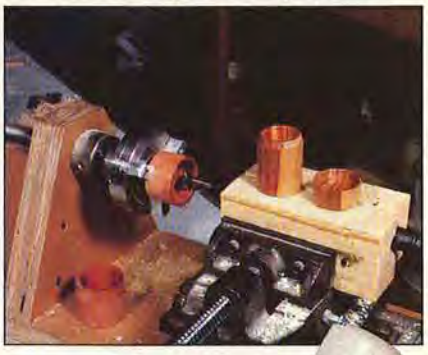
Spreading the woodturning gospel

Woodturning may be Bonnie's profession, but her passion lies in the learning, problem-solving process that accompanies it. "I guess I enjoy that as much as the turning. And, I like exposing others to that learning process. Teaching turning excites me," she says.

"Not everyone is cut out to sit in front of a computer for a lifetime," Bonnie continues. "Some people are going to have to make a living with their hands."

At Bonnie's once-a-week session with Tahoma Junior High School's woodturning club, there's at least one dedicated convert to her gospel. "Someday, I'm going to buy a lathe from Bonnie and make a living with it," states 13-year-old Brian Eddy, earnestly. Holding up a tiny goblet and matching bowl done over the last hour, the student adds, "And I'll sell these in lots of gift shops."

Brian's shop teacher, Les Dawson, got acquainted with Bonnie through their local adult woodturning club. And more than a year ago, he asked her to teach woodturning to kids for a few hours each week after school. She, of course, said yes. "Any chance I have to demonstrate to kids, I jump at it," Bonnie comments. "There's so much today geared to mental activity. It's important for



The power source for Bonnie's threading jig is a flexible-shaft carving tool in a wooden mount.

Bonnie worked her lathe magic to produce the two ebony goblets, *below*, and the Corian mortar.

At Tahoma Junior High's woodturning club, Bonnie assists Daniel Scott Campbell with a touchy cut. Evan Olson, *right*, looks on, while Brian Eddy focuses on his turning. Under Bonnie's tutelage, students gain confidence in working with their hands.

children to know that they can be creative with their hands, too."

Now, the woodturning club has five of Bonnie's small lathes that the school purchased. And Bonnie brings extras for the session so that all the members can keep busy turning.

During the one-to-two-hour meetings, each one of the 12 young turners tackles a project or two. About half the students are girls, and they put sharp steel to the turning wood as fearlessly as any boy. "Not surprising today," observes Bonnie.

"Even in my adult classes, nearly half the students are women," she states. "Five or six years ago, I didn't know any women turners. Now, there are more all the time. I think small-scale turning appeals to them. It's not so frightening. Women can learn turning in this scale, and because the techniques are the same, they can apply them to the bigger lathe later if they want to go on."

Making it big with small turnings

The miniature-turning bug bit Bonnie about a dozen years ago, when her daughter Amy was interested in 1:12 scale dollhouses. "I acquired all the tools to build a dollhouse and the furniture, and with them, a Dremel lathe," Bonnie remembers. "I learned to turn on it from miniature furniture-maker Noral Olson [see *WOOD*® magazine, December 1987]. And I had a laugh with that little lathe. I really got excited about turning again because I could experiment

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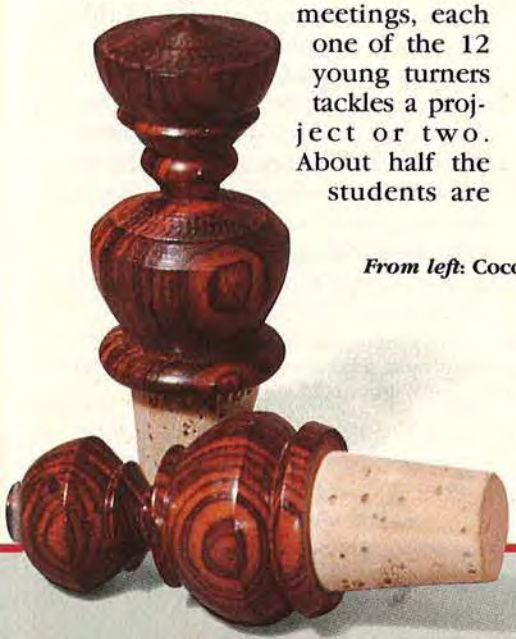
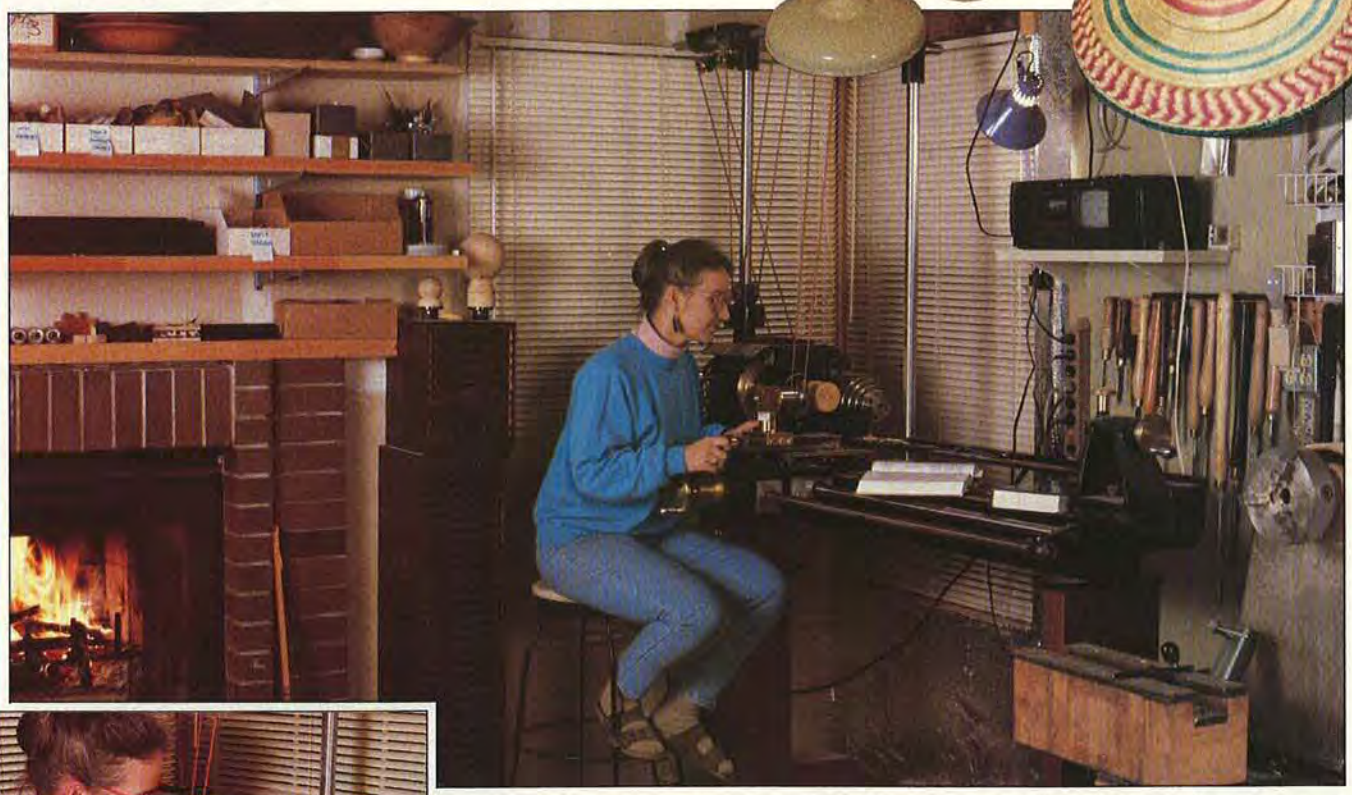


***From left*: Cocobolo cork toppers, 3¾" overall; maccassar ebony bowl, 2½" diameter; and a cocobolo box, 2½×1½".**

GRAND TURNINGS



Once she masters her brand-new Lawler ornamental lathe, Bonnie will produce exquisitely decorated turned objects. Bonnie explains the fireplace: "This was designed as a family room, but it made a better shop."

on that smaller scale. I could make mistakes, but they were proportionately less disastrous."

Bonnie grew adept at miniature turning, even to the point of teaching classes. But, she yearned to learn more about other aspects of woodturning. Her search led her to some renowned woodturning gurus, such as Utah's Dale Nish and Australia's Richard Raffin. She also attended seminars, symposiums, and workshops.

While her children were growing up, Bonnie worked as dental technician and co-owner of a dental lab. But when her children went their own way, Bonnie decided to sell her business and try full-time woodturning.

"My living depended on doing small-scale projects—spinning tops, the earrings, the things I could sell wholesale by the dozens to shops and galleries," Bonnie recalls. The photos here and on preceding pages show the vast assortment of small-scale turnings in Bonnie's inventory. "The sales were very important at that time, because I was just beginning to design my own lathe."

On her lathe, aluminum aircraft rivets become ½" tall goblets. Corian, a countertop material, makes a mortar and pestle. Then there are bowls and boxes, corn-cob holders, earrings, acorns, pens, letter openers, bottle stops, and jars made of bone, imitation ivory, and cow horn, as well as all types of wood. "If I can mount it on the headstock, I'll turn it," she says.

Soon to be added to Bonnie's inventory will be intricately ornate items unlike any she's made before. They'll come off her Holtzapffel-type ornamental lathe, shown *above*.

Purchased for $10,000 from Lawler Manufacturing in Kansas

More tiny turnings from Bonnie's repertoire. *Left to right*: lignum vitae earrings, 2" long; six bone goblets, ¾–⅜" tall; and from aluminum aircraft rivets, teeny goblets ½" and ⅝" tall, and spin tops ½–⅝" diameter.

A tagua-nut box, *far left*, measures 1¼ × 1½". Spin tops are from ¾" to 2" diameter.

Right: A 2¼ × 1¾" cast-polyester box, an acorn box, a top.

City, the new design of a Victorian machine features extremely fine adjustments of its two cutter heads. And infinite possibilities.

Turning up the technology

Demonstrations at woodworking shows help Bonnie market her lathe and turning tools, and provide customer insights. "I took a booth at a trade show for industrial arts teachers here in Seattle last year," Bonnie says. "As I was demonstrating, a father and son walked up to the booth. Watching me turn, the father said pointedly to his son, 'This is how it was done before there was technology.' I had to laugh—turning may not be high tech, but my lathe sure beats pedal power!"

And the small-scale lathe she developed more closely meets her needs than the tiny Dremel she once owned. But first, Bonnie graduated to a jeweler's metal-turning lathe with an 18" bed. Yet, that wasn't quite the answer, either. "A metal lathe is difficult because it's hard to reposition the tool rest to get at the wood," she explains. "To solve that problem, I had a friend build a tool rest to fit." Then, she knew that a metal lathe would work.

Following some redesign of the rest and lathe bed, Bonnie's idea eventually became a product. According to Bonnie's figures, about half the people who buy her lathe are first-time turners. Her lathe, priced at about $350 less electric motor, features an 18" bed for 12" between centers, a swing of 5", and takes a ⅙-hp or ¼-hp motor.

Of course, you don't necessarily have to own a small lathe to turn small. Says Bonnie, who has turned tiny goblets on a massive, outboard bowl lathe, "Yet, the smaller the project you try to turn on a full-sized lathe, the more problem you have with vibration. It's actually more important to have the tools in scale than the lathe." Accordingly, Bonnie designed turning tools to accompany her lathe—they're sized between full and miniature.

Bonnie always seems to be looking to solve a problem or do something a new way. Her threading jig, designed to put inside and outside threads on covered jars, evolved from curiosity.

A new twist on invention

"A few years ago, while browsing through an antique store, I saw a little, round wooden jar with a lid that unscrewed, and I wondered how I could make one. After researching and asking questions for a year, I finally came up with this," she says, chucking a finely turned cherry cap into the headstock of the jig. With a miniature cutter fitted into a flexible shaft carving tool, the jig creates inside and outside threads in minutes.

With Bonnie's experimenting, lathe marketing, and seminar teaching, actual turning has taken somewhat of a backseat, a condition she admits. "I don't do enough turning, compared to other activities, but it's important to keep my work out there for the recognition," Bonnie says. "People need to know that I really do produce things once in awhile. But right now, I'm more involved with figuring out *how* to do something, then I'm on to the next challenge." Right on, Bonnie.

Write to Bonnie Klein

For lathe, tool, and video information, write: Klein Designs, 6415 115th Place S.E., Renton, WA 98056.

Top: **In the lathe, a scrap of maple becomes a finger top. Bonnie decorates the end grain with a chatter tool—its spring-steel bit bounces across the grain producing intricate designs.** ***Above***: **Bonnie adds color to the top with artist's colored pens as it spins .**

Right: **A "bovine" ivory (cow bone) box, 1½ × 1⅛", and a tagua nut bowl, 1½ × 1½".**

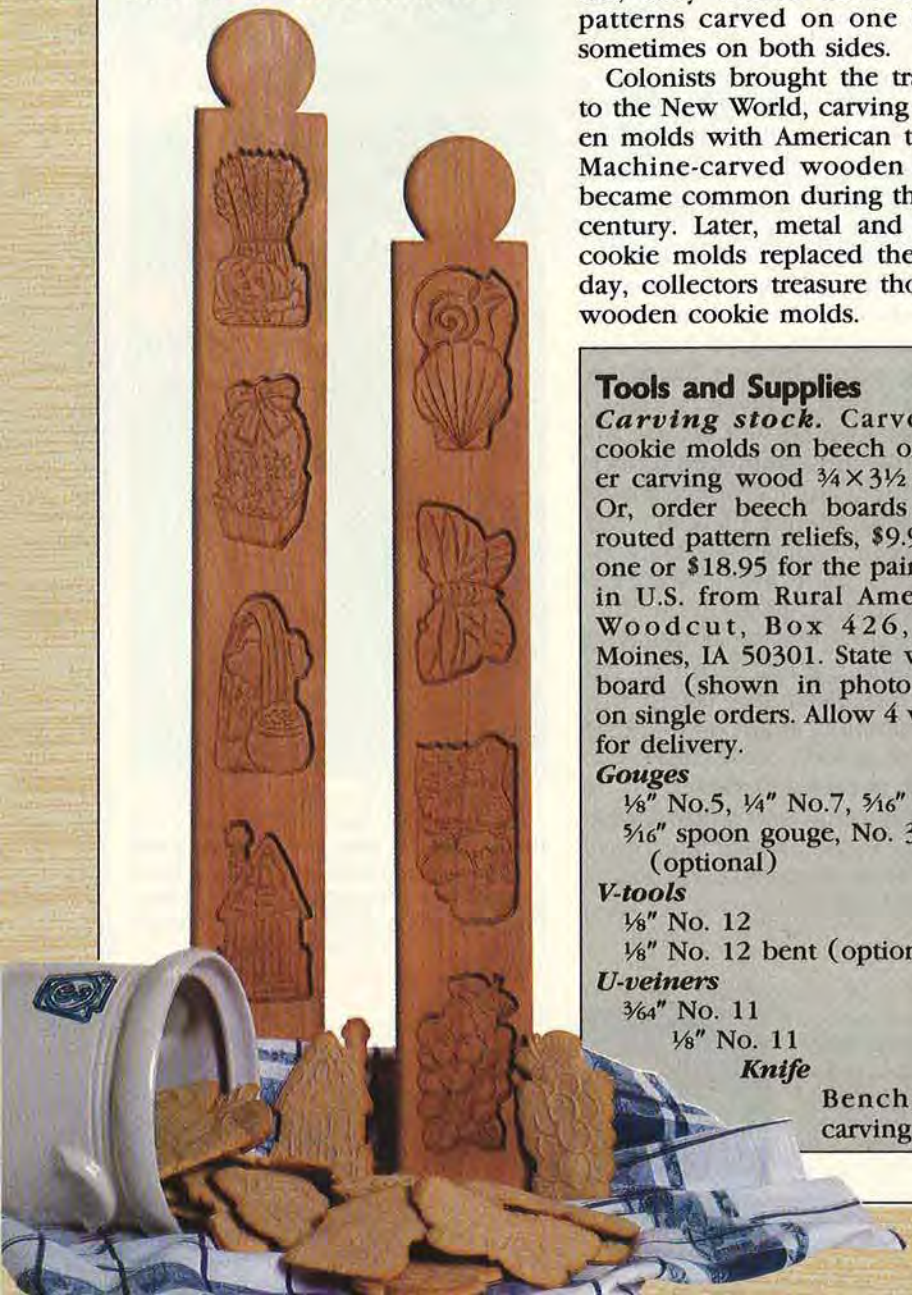
Written by Peter J. Stephano Photographs: Gary Zeff

Print this article

Give your cookies and your

HAND-CARVED

When you're ready for milk and cookies after doing this carving, you won't have to wonder where to get the cookies. Simply make them in your hand-carved molds using our *Better Homes & Gardens*® Test Kitchen recipe on the *opposite page.* Then, hang the molds on your kitchen wall for an old-time accent.



Cookies from woodcarvings

Woodcarvers and bakers first teamed up to turn out fancy cookies more than 400 years ago. From the mid-1600s until well into the 19th century, vendors at European fairs and markets hawked gingerbread portrayals of saints, royalty, and other popular figures.

Bakers accumulated a jumble of molds as they added new patterns. To cut down kitchen clutter, they would have several patterns carved on one board, sometimes on both sides.

Colonists brought the tradition to the New World, carving wooden molds with American themes. Machine-carved wooden molds became common during the 19th century. Later, metal and plastic cookie molds replaced them. Today, collectors treasure those old wooden cookie molds.

Tools and Supplies

Carving stock. Carve the cookie molds on beech or other carving wood ¾×3½×27". Or, order beech boards with routed pattern reliefs, $9.95 for one or $18.95 for the pair ppd. in U.S. from Rural American Woodcut, Box 426, Des Moines, IA 50301. State which board (shown in photo *left)* on single orders. Allow 4 weeks for delivery.

Gouges
- ⅛" No.5, ¼" No.7, 5⁄16" No.5
- 5⁄16" spoon gouge, No. 3 or 5 (optional)

V-tools
- ⅛" No. 12
- ⅛" No. 12 bent (optional)

U-veiners
- 3⁄64" No. 11
- ⅛" No. 11

Knife
- Bench-type carving knife

Now, let's get cookin'

Start with a ¾×3½×27" piece of beech for a functional four-mold board, or select your favorite carving wood for a decorative version.

Mark the centerpoint for the decorative rounded top where shown on the Cookie Board drawing, *opposite page.* Adjust your compass to 1½" to lay out the circle, and then draw a straight line across the top where shown to form the shoulders. Cut the top profile with your bandsaw or scrollsaw. If you plan to use your cookie molds often, carve them on a 24" board and omit the round top. Why? Leaving straight ends on the board makes it easier to slap it against a countertop to pop the cookies loose.

Draw a line across the board 1¼" above the bottom edge. Now, select four of the patterns on *pages 32-33* and photocopy them. With scissors or an X-acto knife, cut out each pattern, leaving a straight line across the bottom.

Pick the pattern you want for the bottom, and then lay it on the board with a piece of graphite transfer paper underneath. Align the bottom pattern edge with the line on the board, and center it from side to side.

Secure with masking tape, and trace the *red* outline onto the stock. A French curve and a straightedge will help you trace more accurately.

Next, draw a line 1¼" above the top of the pattern. Align the next pattern on that line. Repeat for a total of four designs on the board. After tracing the patterns, set them aside; you'll need them again later.

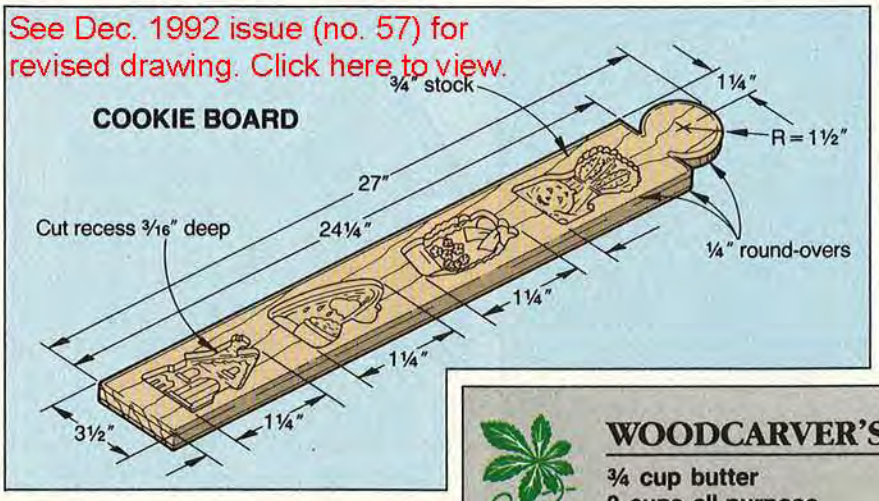
Carve out some reliefs

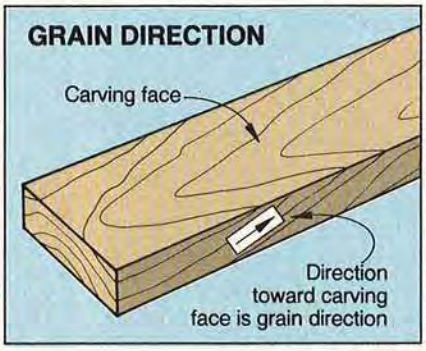
Treat each mold as a small relief carving. First, remove wood to a depth of about 3⁄16" within the

kitchen character with these

COOKIE MOLDS

See Dec. 1992 issue (no. 57) for revised drawing. Click here to view.





WOODCARVER'S COOKIES

¾ cup butter
3 cups all-purpose flour
1 cup sugar
1 egg yolk
¼ cup milk
¼ tsp. baking powder
¼ tsp. ground cloves
1 tsp. ground cinnamon
1 tsp. ground cardamom

In a bowl beat butter with an electric mixer on medium to high speed about 30 seconds or till softened. Add 1 cup of the flour to the sugar, egg yolk, milk, cinnamon, cardamom, baking powder, and cloves. Beat until thoroughly combined, scraping the sides of the bowl occasionally. Then, stir in remaining flour.

Oil the wooden cookie mold. Press dough firmly into mold and level it. Then, unmold dough onto a greased cookie sheet by rapping the end of the mold firmly on a countertop. Repeat with the remaining dough, placing the cookies about 2 inches apart on the cookie sheet.

In an oven preheated to 375 degrees, bake for 10 to 14 minutes or till edges are lightly browned. Cool on cookie sheet for 1 minute. Then, remove cookies and cool on a wire rack. Recipe makes about 15 cookies.

pattern outline to create the relief area, a process called *grounding.*

Start grounding with a vertical knife cut along the pattern outline. This cut, a *stop cut,* enables you to clean out wood with your gouge right up to the edge of the relief area without chipping out wood beyond it.

You also can stop-cut with the V-tool, but be sure to keep the cutting edge vertical. You'll need to stop-cut several times as you carve down to the final relief depth with your gouges.

You'll accomplish most of the grounding with ⅛" and 5/16" No. 5 gouges. Although a 5/16" No. 3 or 5 spoon gouge and a ⅛" No. 12 bent V-tool will come in handy, they aren't essential. Work down to depth in stages of stop-cutting and gouging out wood.

Work with the grain when cutting lengthwise. Our beech boards chipped out readily when we turned against the grain. To determine the grain direction, look at the edge of the board. Then, starting at about the middle of the edge, trace with your finger along one of the grain lines. The direction you move your finger along the grain line to reach your carving face is the grain direction. (See illustration, *above right.*)

Keep the sides of your reliefs vertical or slightly flared. Be sure not to undercut them. (If you do, the dough won't come out of the mold in one piece.) Carve a crisp junction between the side of the relief area and the bottom.

Maintain uniform relief depth within each mold. Be sure to carve all molds the same depth, too. The cookie dough shapes will bake better if they pop out of the molds the same thickness.

For quicker grounding, rout the pattern outlines with a ⅛" straight bit in a plunge router. Work down to final depth in several passes. Change to a larger bit to clear the middle of the recess. (Or, see the supplies box on the *opposite page* for information on buying pre-routed blanks.)

For the smoothest project flow, ground all four molds on the board first. Then, carve the detail lines for each design, completing one mold before moving to the next one.

Add detail to your molds

With the grounding done, cut out the paper patterns along the *red* outlines. Trim each one to fit into its carved recess. Then, with a

Continued

HAND-CARVED COOKIE MOLDS

same-sized piece of transfer paper, trace the *black* lines for carving.

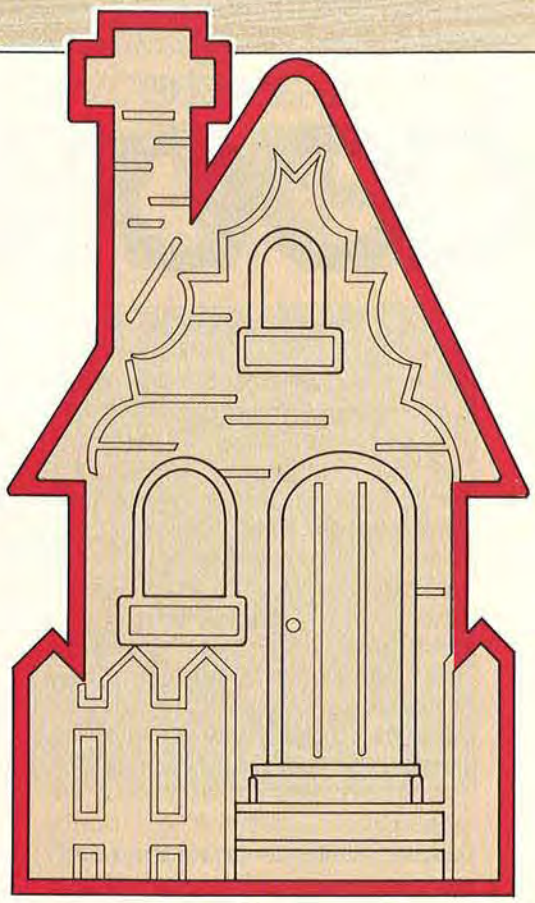
Cut the design with your 3/64" or 1/8" No. 11 U-veiner, as appropriate. The veiner leaves a round-bottomed groove, which we think looks better than a V-shape for this job. Go at least 1/8" deep; deeper cuts, we found, make better-looking cookies.

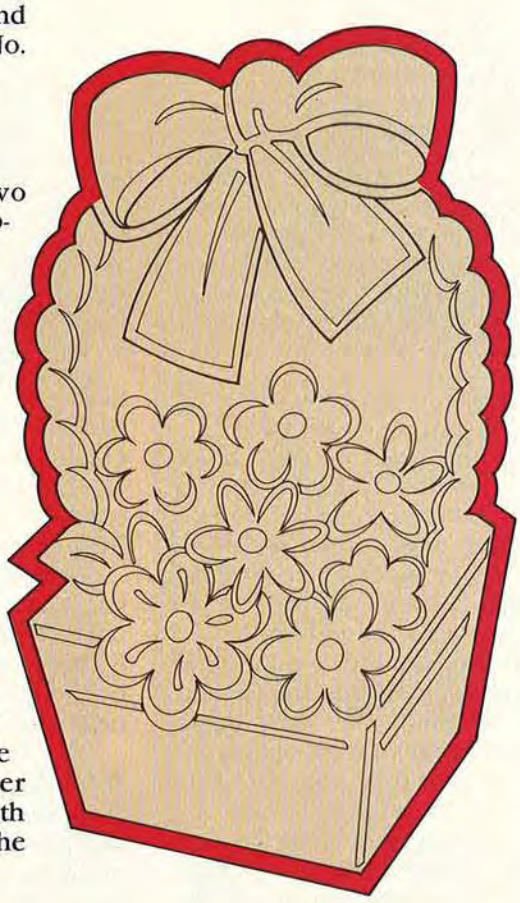
Switch to gouges to carve the crescent shapes (duck feathers, for example). Select a gouge of the correct sweep and width for each. (Don't worry if you don't have a lot of gouges; a few will provide enough variety. A 1/8" and a 5/16" No. 5 and a 1/4" No. 7 did the trick for us.)

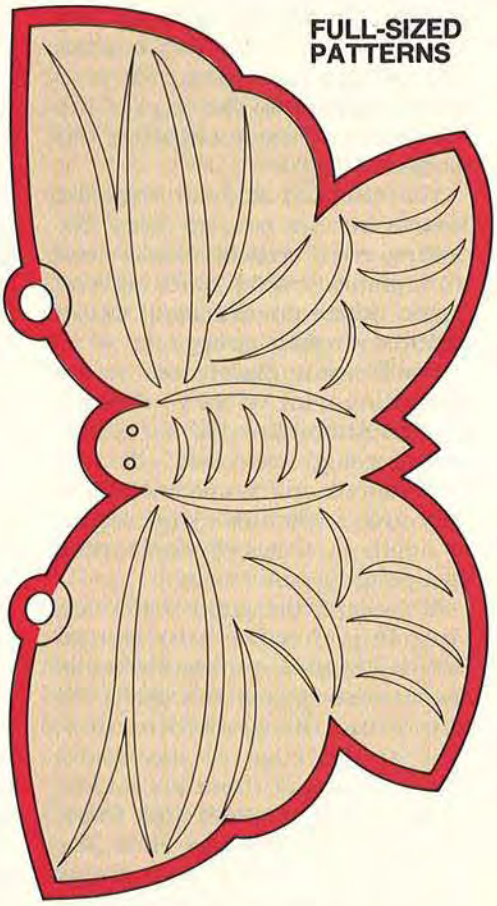
Cut crescents the easy way

Carve each one in two steps. (See photos, *opposite page.)* First, lean the gouge away from you at a slight angle so that the bevel on the back of the blade is perpendicular to the workpiece and facing you. Then, force it into the wood (*top photo*).

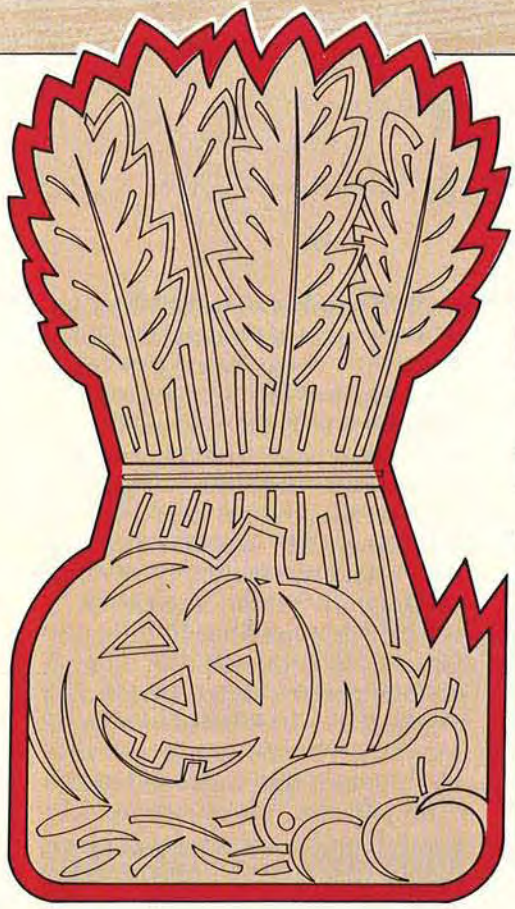
Next, with the gouge in the carving position, place a corner of the blade at one end of the curved incision and at a small angle in front of it. Now, roll the gouge around until the other blade corner meets with the opposite end of the arc (*bottom photo*).

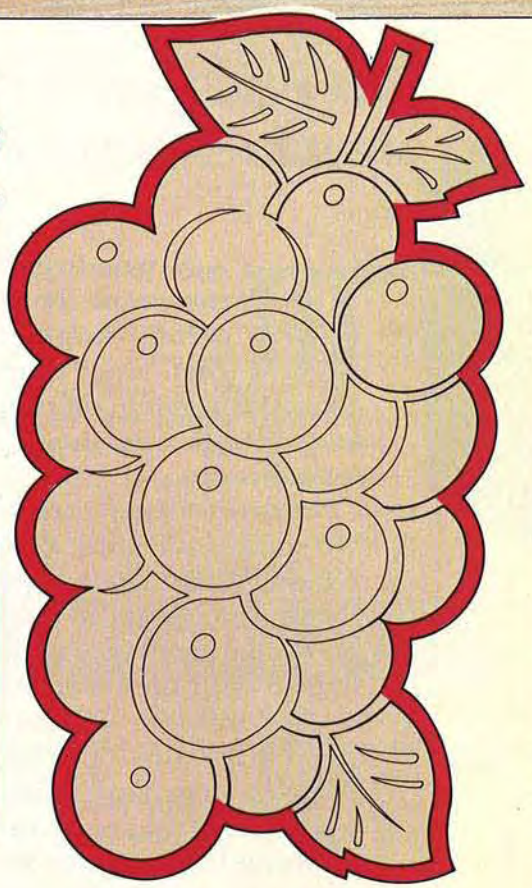


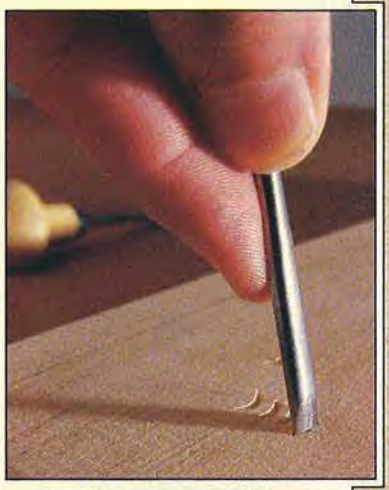




FULL-SIZED PATTERNS

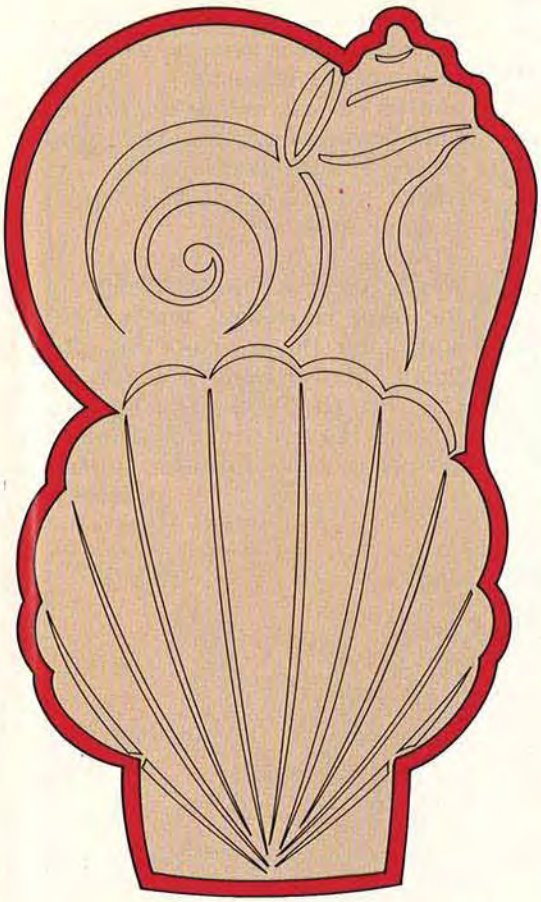






Begin the crescent with the gouge's bevel perpendicular to the carving surface.

Roll the gouge from one side of the arc to the other to complete the cut.



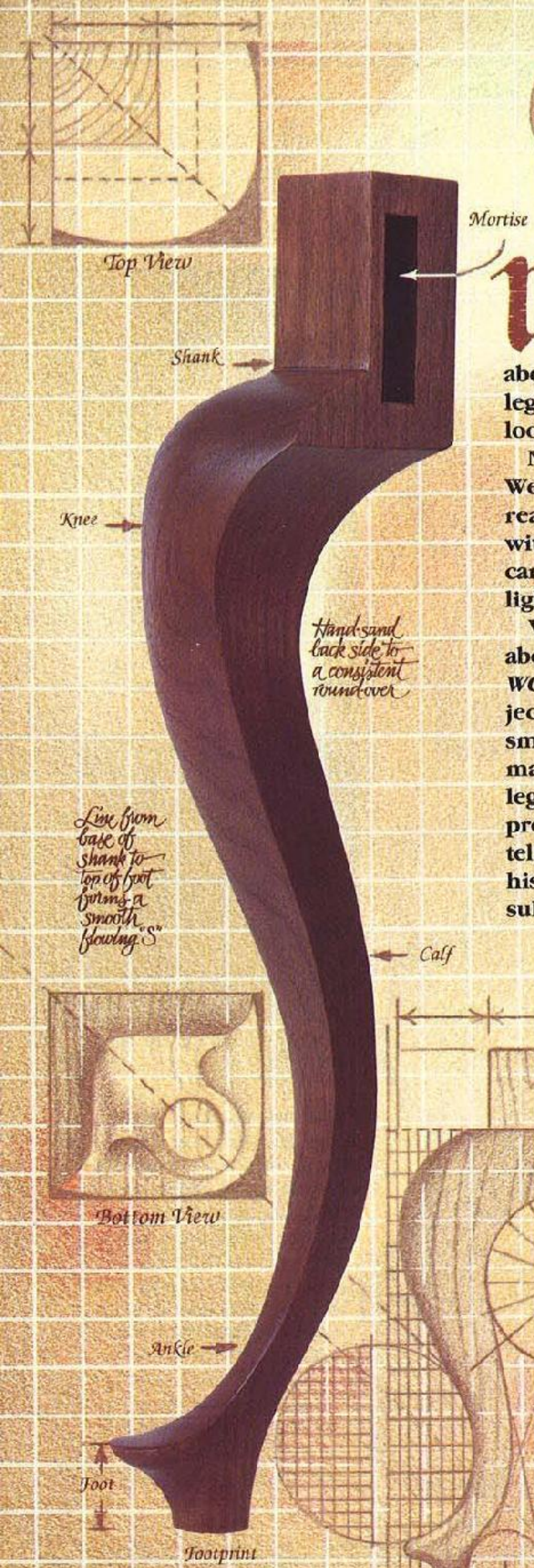
Finishing up

With the carving completed, rout a ¼" round-over along all edges and a hanging slot in the top center of the back side. Turn your 5/16" No. 5 gouge over to complete the round-overs in the corners between the circle and the board.

Sand the board, rounding over the outer edge of each pattern recess. Finish with salad oil.

Project Design: Jim Stevenson Illustrations: Kim Downing; Mike Henry Photographs: John Hetherington

Cabriole



Many woodworkers come completely unglued when they think about fashioning cabriole legs. Let's face it, they do look daunting.

Now for the good news. We guarantee that after reading this article—and with a little practice—you can build them and be delighted with the results.

Why are we so sure about this? Jim Boelling, *WOOD*® magazine's project builder, learned the smart and simple way for making graceful cabriole legs years ago as an apprentice. And, as you can tell by looking at one of his beauties at *left*, the results speak for themselves.

A quick anatomy lesson

Because a cabriole leg's anatomy resembles that of your own leg, it's easy to remember the various parts (see photo at *left*). Like you, a cabriole leg has a *foot, an ankle, a calf,* and *a knee.* Oh, there is one big difference, though: a cabriole leg has an *ear* attached to its knee! You add the ear after attaching the leg to the *apron* or *rail.* The ear matches the ear profile on the end of the rail. A square *shank* atop the leg has *mortises* for receiving the *tenons* of the adjoining aprons or rails (only one mortise and apron/rail visible in the view *below).*

LAYOUT

After choosing one of the four leg patterns on *pages 40 and 41,* make poster-board templates of the leg and its corresponding ear profile, knee, and foot patterns. The smallest leg (footstool size) doesn't require an ear-profile pattern because of its size.

Next, you'll need a 3×3" square piece of wood for any of the three large legs, and a 2×2" square for the footstool leg. The length of the stock depends on the length of the leg (wider aprons require longer shanks). We prefer to use furniture squares

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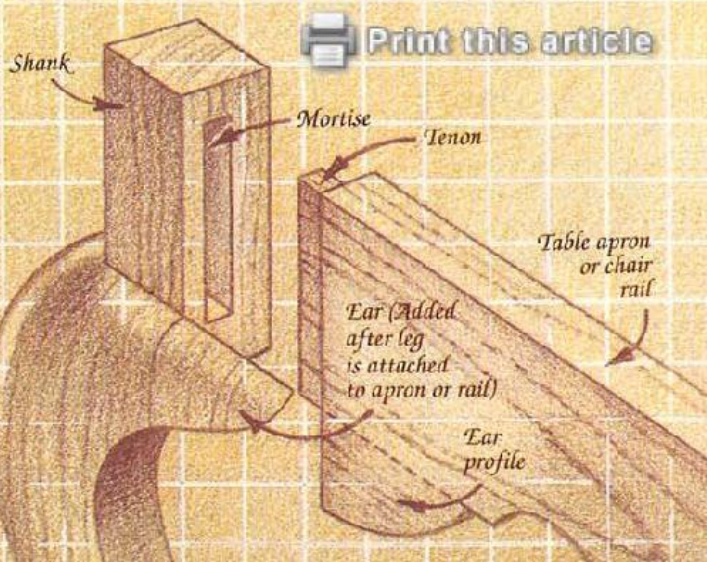


Legs

The "you-can't-miss" way to make these classic beauties

for their grain uniformity, but you could laminate these workpieces from thinner stock.

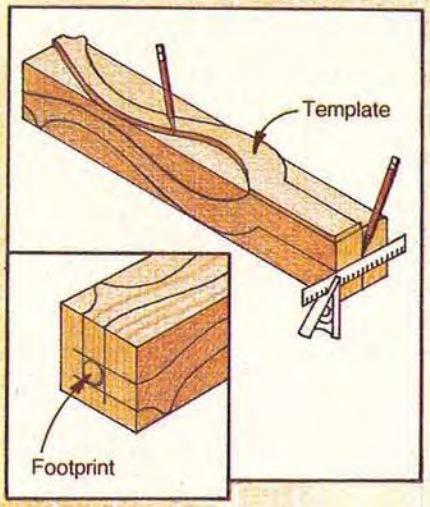
Then, square the workpiece so adjoining faces are 90° to one another. Otherwise, you'll bandsaw the leg to a distorted shape in later steps. (For more squaring information see the "Develop your shop skills" article on *page 71.*)

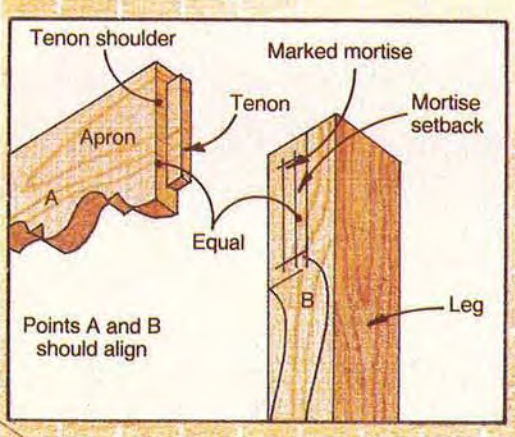
As shown in the drawing *below*, you need to mark the leg pattern on two adjoining faces of the stock. Then, with a try square, extend the lines at the top of the shank onto the end of the stock.

Next, extend the lines at the bottom of the leg onto the other end of the stock as shown in the inset drawing *below*. With a compass or circle template, draw a circular footprint that just touches all four sides of the square formed by the intersecting lines.

Now, mark the mortises in the necessary locations. As shown in the drawing at *bottom left*, we marked the mortise setback so it's equal to the width of the tenon shoulder. This way, the front faces of the shank and aprons align flush with each other (as shown in the project on *page 42*).

Also, remember that points A and B in the drawing at *bottom left* should align (for ease in applying the ear later). Keep this in mind when you lay out the apron. ***Note:** First cut the mortises, then cut the tenons to fit, and then proceed to the next step. For more information on mortise-and-tenon joinery, see the December 1991 issue of* WOOD *magazine.*





THE SHAPING SEQUENCE

So far, all you have is a square length of wood with a few important lines on it—a lifeless form. But watch what happens as you complete each of the steps that follow. You'll be amazed!

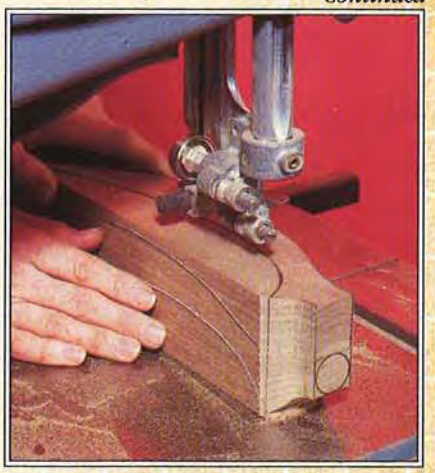
The tools and supplies you'll need to do the job

To rough-shape cabriole legs you'll need a bandsaw. For finish-shaping, we use a stationary belt/disc sander and 1" and 1½" drum sanders, but you can substitute other sanding tools such as a portable belt sander mounted in a stand. Use 50- or 60-grit abrasives, and protect yourself by collecting as much dust as possible and wearing a respirator and goggles.

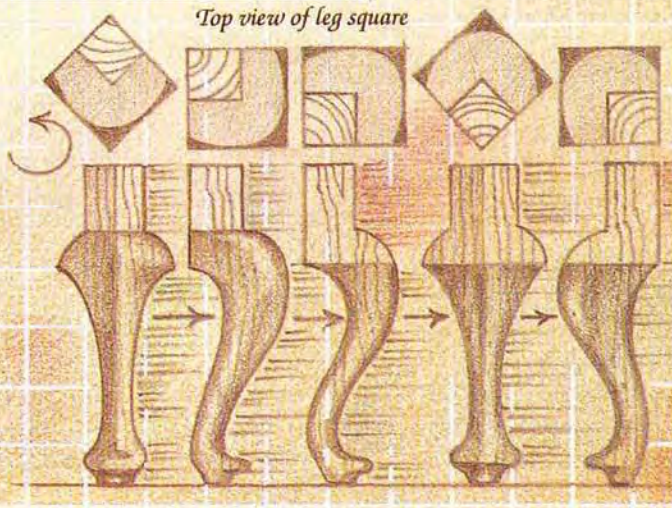
Bandsaw the leg to rough form

With a ¼" blade (⅛" blade for the footstool-sized leg), bandsaw along the layout lines on either of the marked faces of your work-

Continued



Top view of leg square



Follow the bandsaw lines for consistently shaped legs

Follow the elevation views as a shaping guide

Cabriole legs

piece. Be careful to closely follow the layout lines. Then, reattach the scrap pieces with double-faced tape and bandsaw along the layout lines on the adjoining face as shown in the photo on the *previous page*. Save your scrap pieces—you'll need them later.

Get off on the right foot by shaping it first

As you go through the following steps, refer often to the photo *below* of the rough-shaped foot. Use it like a road map and you're sure not to get lost. Each of these steps corresponds to a numbered photo or drawing.

1. Stand the leg upright and center the foot pattern over the foot. Mark along the inside of the pattern as shown.

2. With the leg upright, sand up to the marked foot outline.

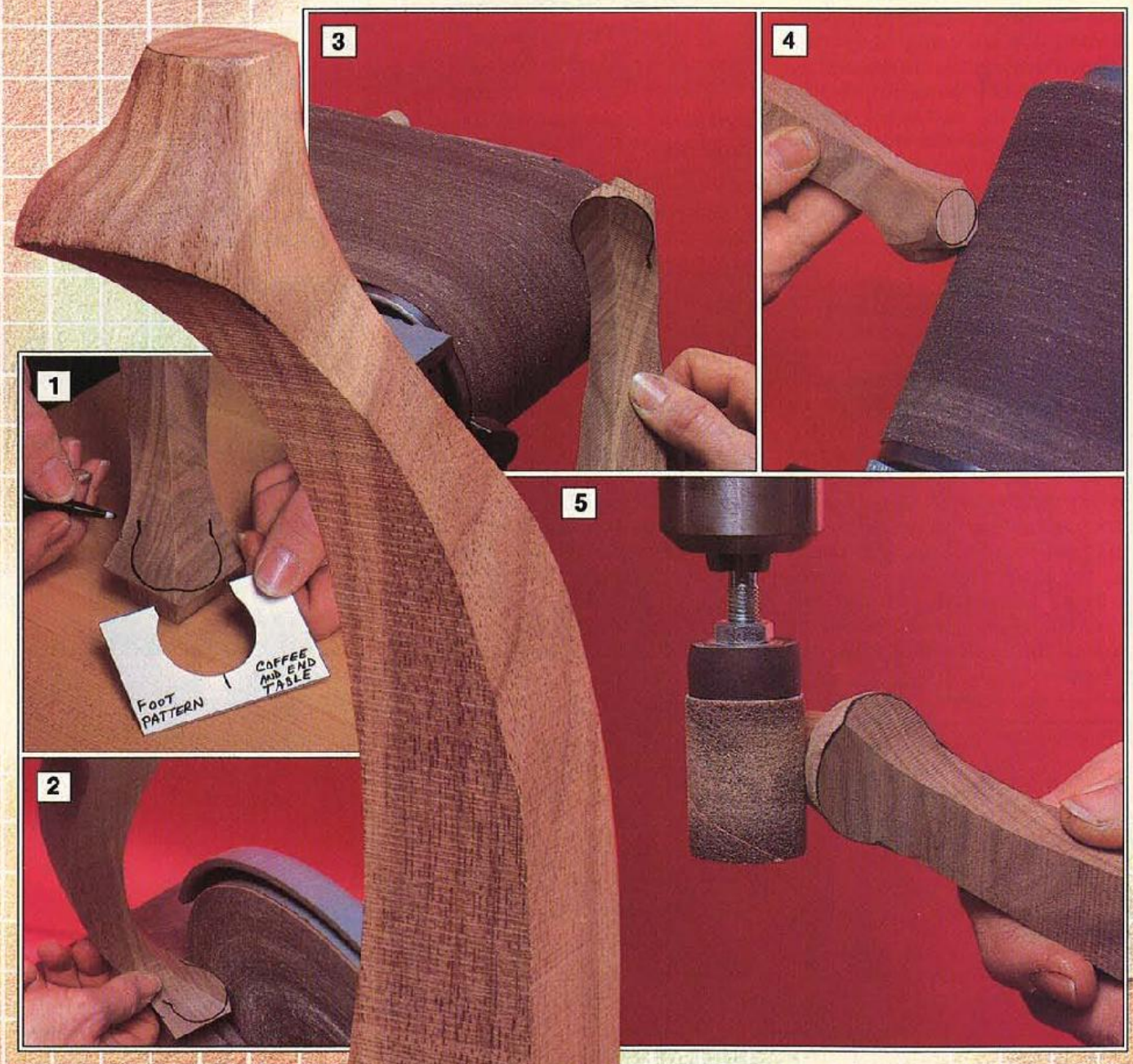
3. To sand up to the concave parts of the foot outline, switch to the outboard end of the belt sander.

4. Hold the leg horizontally and sand up to the marked footprint.

5. With a 1" drum sander, round the stock between the top of the foot and the footprint. (Remember to check the photo of the rough-shaped foot as you work.)

Work your way up the calf

6. Hold the leg as shown and mark a straight line from the thinnest part of the leg just above the



foot to just below the knee. For best results, close one eye and sight the line with your other eye.

7. Sand up to the lines you just marked by placing the back faces of the leg onto your belt sander.

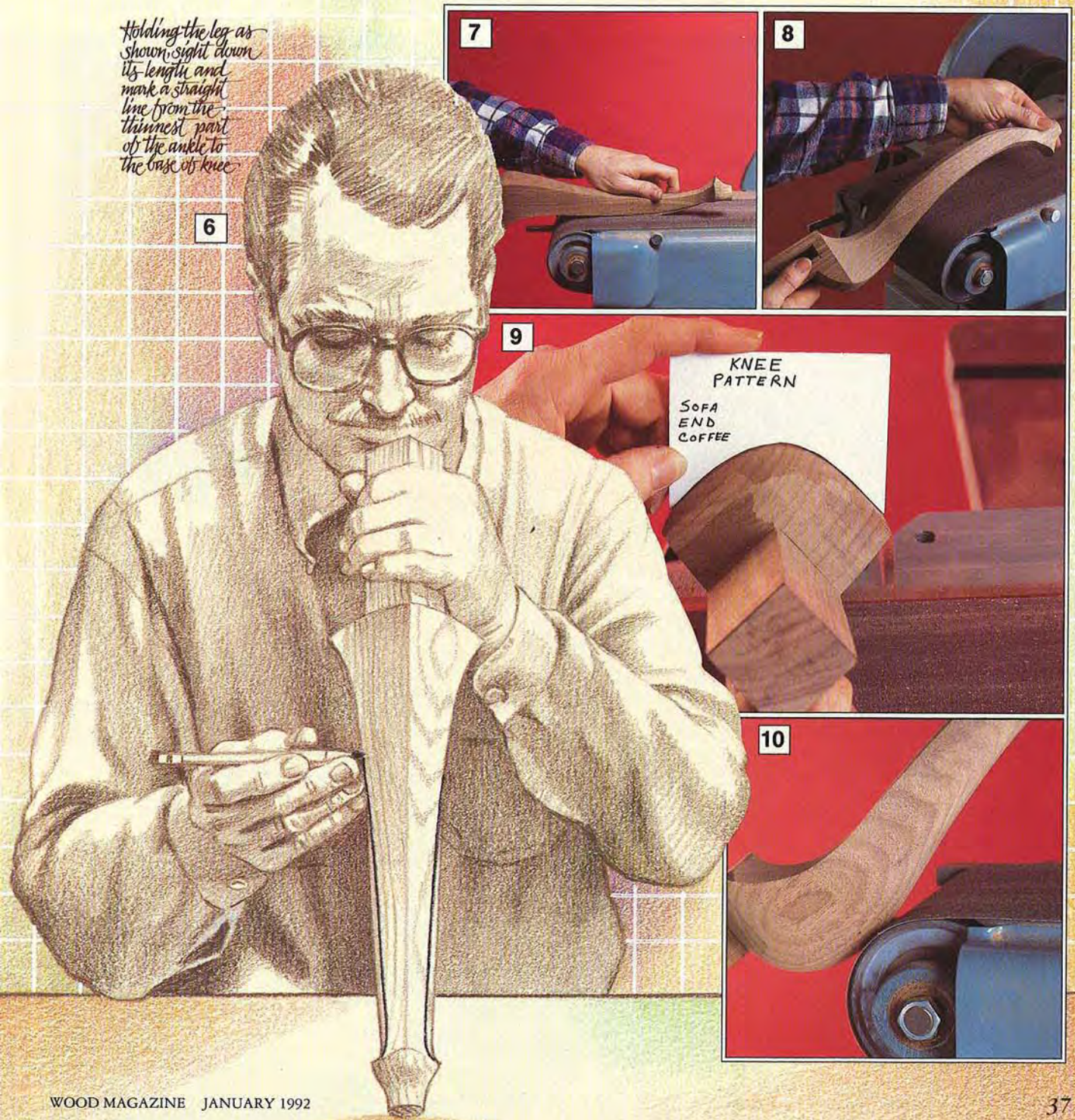
8. Sand a ¼"-wide flat along the length of the front and back ridges of the leg as shown. Use this same motion, but rotate the leg side to side, to gently round over the flats.

And now, for a shapely knee

9. Hold the knee pattern up to knee (about 1" below the shank). You'll notice that the knee requires additional rounding over. When the knee matches the pattern as shown, stop sanding. (Be careful not to accidentally sand the shank.)

10. The previous step will create a hump below the knee, so blend together the knee and the front surface of the calf as shown. Sand as far as the ankle.

Continued


Holding the leg as shown, sight down its length and mark a straight line from the thinnest part of the ankle to the base of knee
6
7
8
9
KNEE PATTERN
SOFA END COFFEE
10

Cabriole legs

LEGS, EARS, AND TABLE

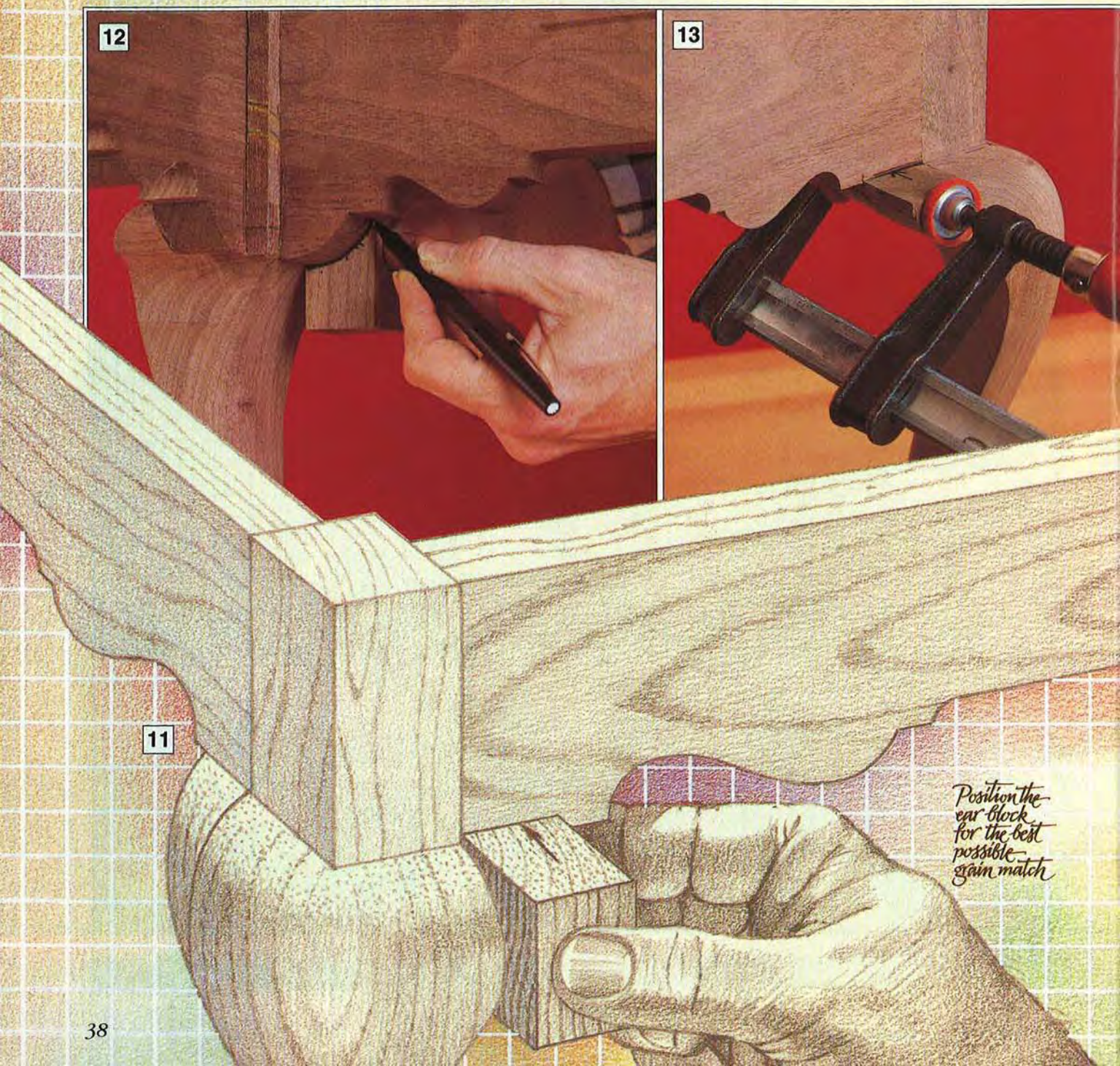
The smart way to get them all together

To simplify the entire process, we prefer attaching the ears after joining the legs to the aprons, rather than before. Besides making things easier, this also assures you of tight-fitting joints between the ears and the table aprons.

Attach and shape the ears

11. After joining the legs to the aprons, choose scrap pieces that are wide enough for an ear. (For the best color and grain matching, choose a scrap piece that came from the same piece of stock as the leg.) For best appearance, position the scrap for each ear so its grain runs in the same direction as the leg's grain. If necessary, square the corner of the scrap that adjoins the leg and apron. Mark an arrow on the scrap to remind you of its position.

12. While holding the scrap in place, trace the outline of the ear profile on the back side of the



scrap. Bandsaw along this line.

13. Glue and clamp the ears in place as shown.

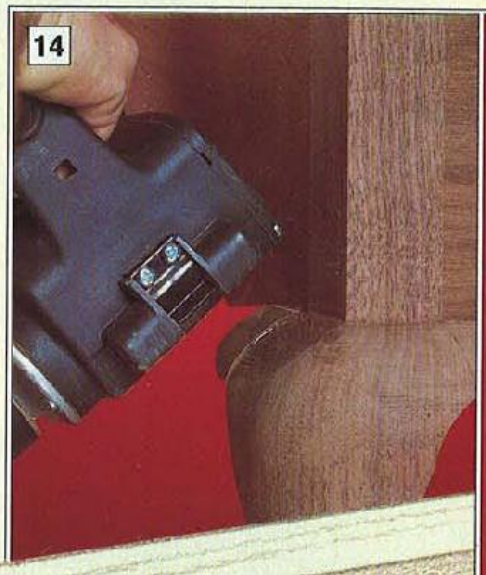
14. After the glue dries, round over each ear with a portable belt sander. To avoid gouges in adjoining pieces, switch to a sanding block as you approach the finished shape.

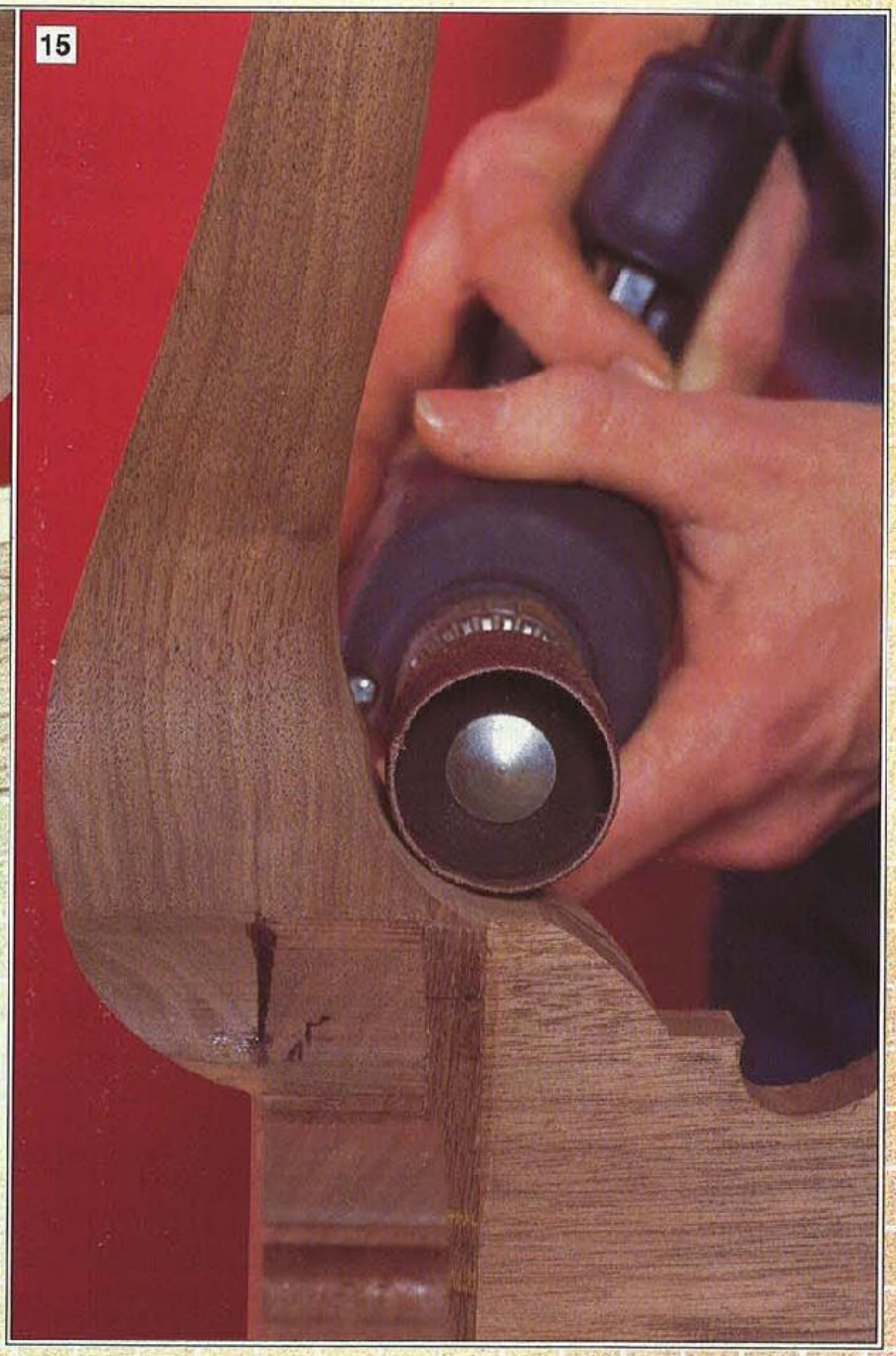
15. Now, turn the table over and blend the ear into the leg with a 1½" drum sander chucked into your portable drill.

The final touch

No matter how carefully you have sanded, the legs probably will have some flat spots that need smoothing. Take care of these by sanding the entire leg with 80-grit sandpaper wrapped around a hardwood block. Then, smooth the legs and other surfaces of your project with a succession of 100-, 150-, and 220-grit abrasives and a soft or padded block.

Patterns on following pages

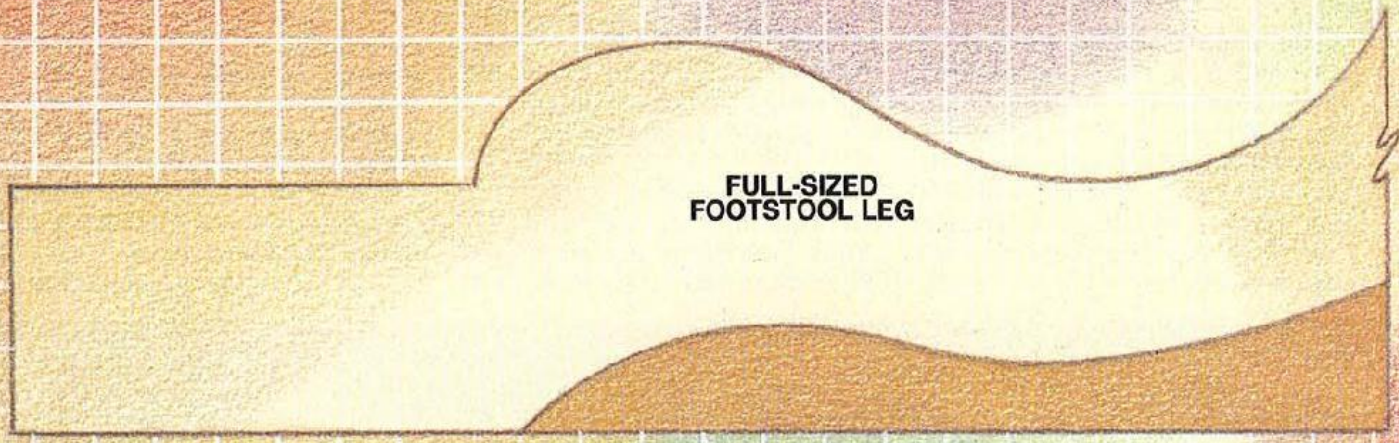


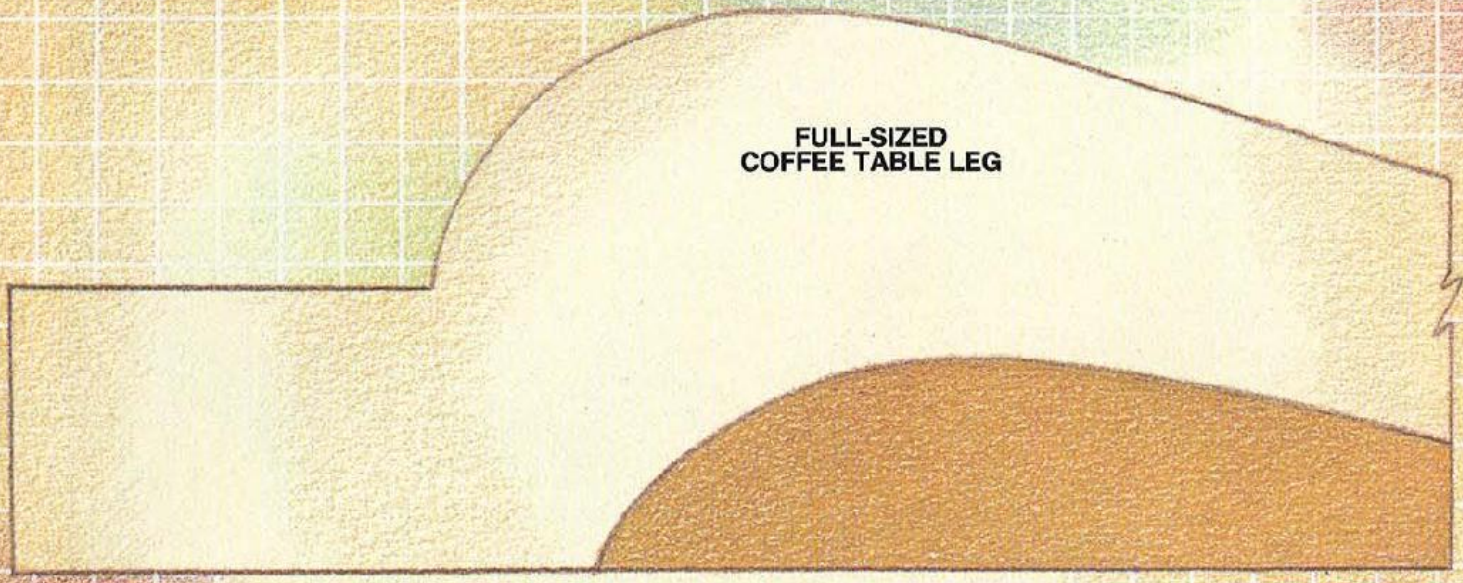


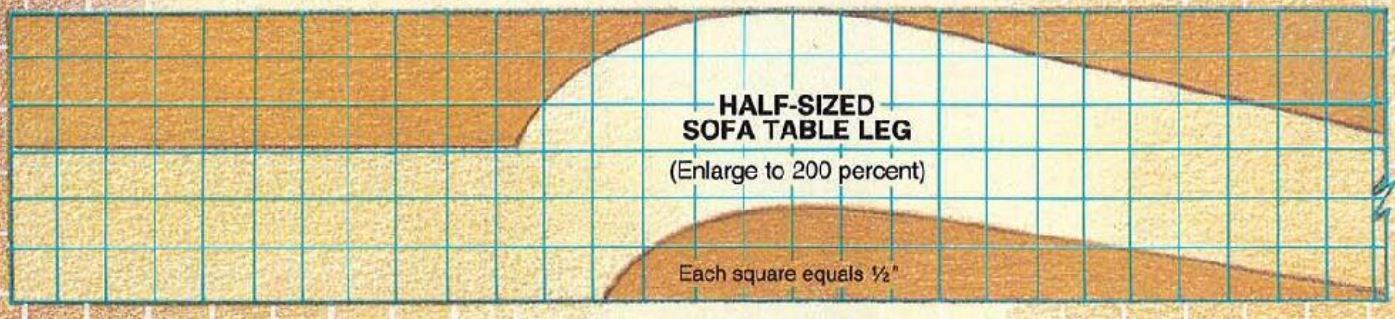
PATTERNS FOR CABRIOLE LEGS OF VARIOUS LENGTHS ON THE FOLLOWING TWO PAGES

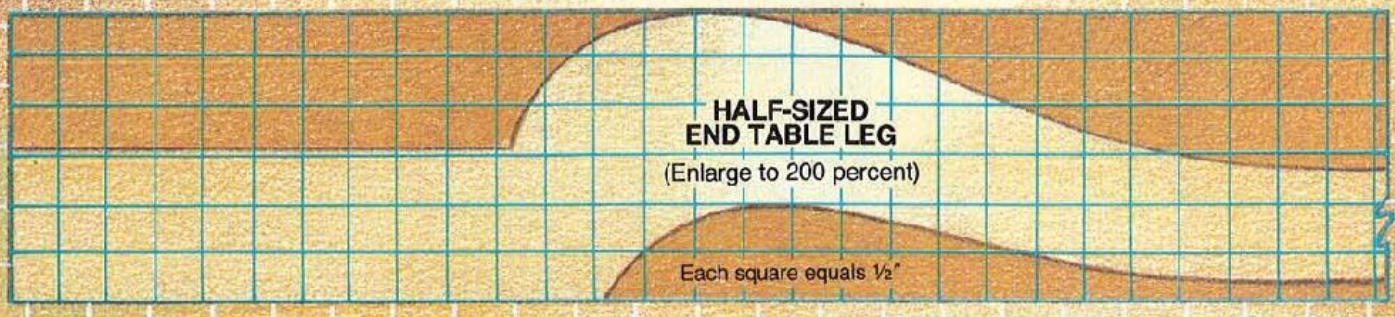
Cabriole legs

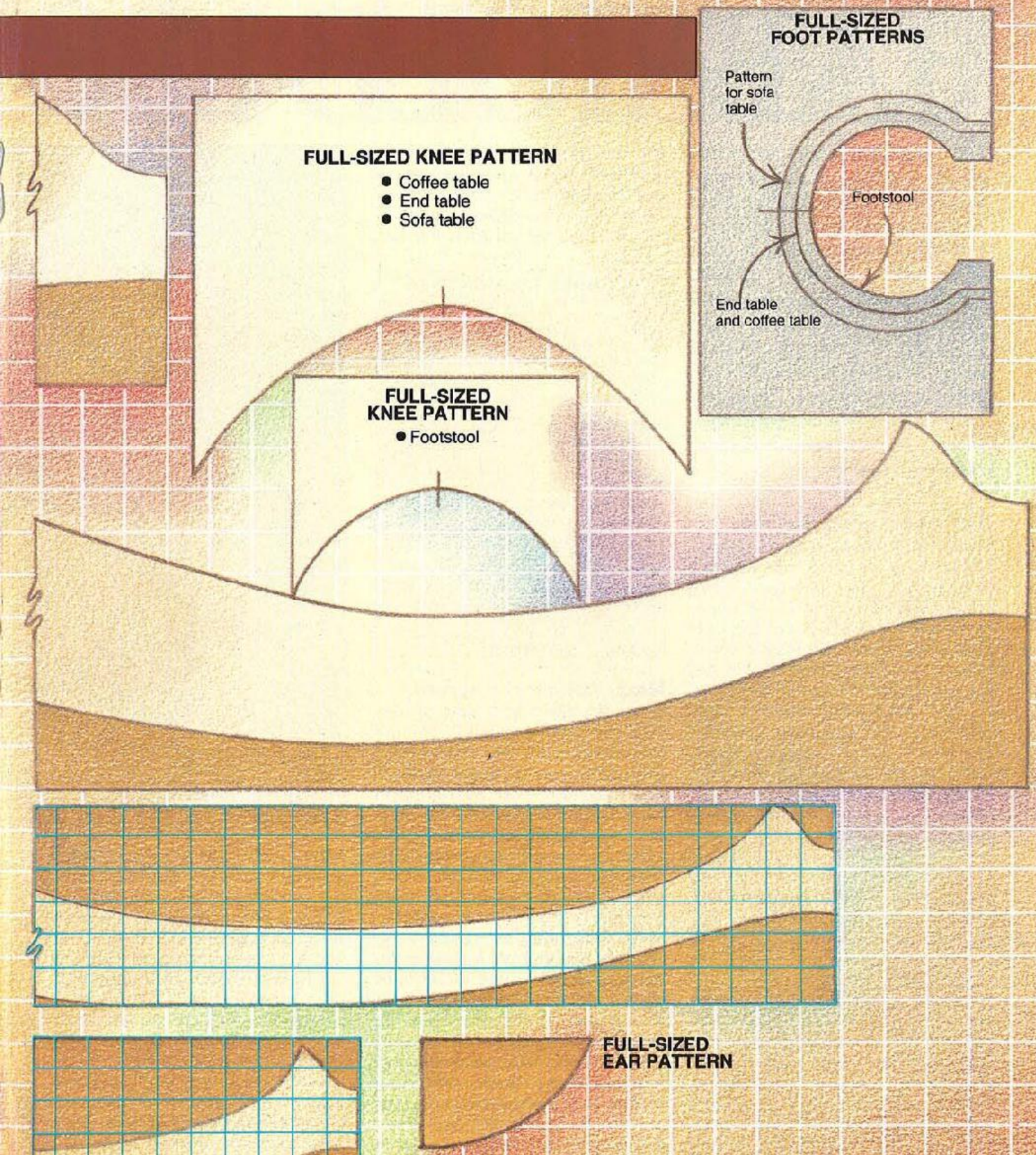
PATTERNS











Written by Bill Krier with Jim Boelling
Illustrations: Kim Downing, Jim Stevenson
Photographs: John Hetherington
Graphic Design: C.L. Gatzke

FIT FOR A QUEEN CABRIOLE-LEG

Print this article

Tapering gracefully from its ample knee to its shapely ankle, the double curve of a well-executed pad-foot cabriole leg distinguishes it as the work of a craftsman. We've combined this classic leg with the rich look of solid walnut to create an elegant Queen Anne-style coffee table. To fill your living room with more handcrafted Queen Anne furniture, see our special design offer on *page 44*.

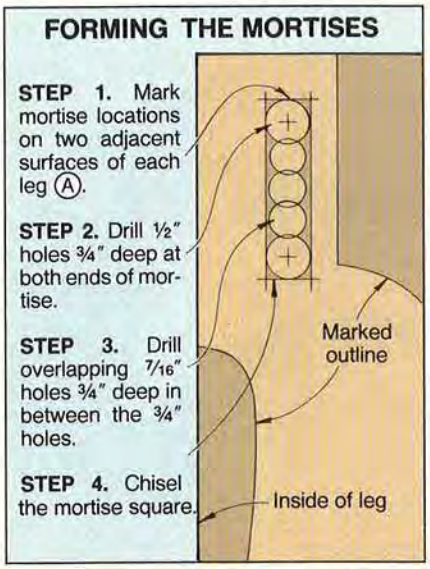
Let's start with the legs

Note: In keeping with the style, you'll need some 3×3" walnut for the legs. You can either purchase furniture squares or laminate thinner stock to size (though this may result in visible joint lines). See the Buying Guide for our source of 3"-square stock.

After laminating the legs and forming the mortises (as described in steps 1 and 2 below), refer to the preceding technique article on cabriole legs for an explanation on how to make these shapely S-curved legs.

1 If you prefer to laminate thinner stock face-to-face to form the 3×3" squares for the legs (A), start by cutting four pieces of ¾"-thick walnut to 3¼" wide by 15½" long for each leg. Then, glue and clamp the pieces together face-to-face, with the edges and ends flush. Next, scrape the excess glue from one edge of each leg, plane or joint that edge smooth, and then rip the opposite edge for a thickness slightly over 3". Joint the cut edge for a 3" finished width. Finally, crosscut the legs to a finished length of 14¾".

2 Following the Mortise detail on the Exploded View drawing and the four steps on the Forming the Mortises drawing *below*, mark and then make the ½" mortises ¾" deep on two adjacent faces on the inside corner of each leg.


FORMING THE MORTISES
STEP 1. Mark mortise locations on two adjacent surfaces of each leg Ⓐ.
STEP 2. Drill ½" holes ¾" deep at both ends of mortise.
STEP 3. Drill overlapping 7/16" holes ¾" deep in between the ¾" holes.
STEP 4. Chisel the mortise square.
Marked outline
Inside of leg

Next, fashion the aprons

1 Rip the front and back aprons (B) and side aprons (C) to the sizes listed in the Bill of Materials.

2 Following Step 1 of the four-step drawing on the *opposite page*, cut the tenons on the ends of each apron. See the Tenon detail accompanying the Exploded View drawing for further reference. Without changing the blade height or stop, you'll need to make three cuts on each end to form the tenon. (We test-cut scrap stock first to verify the blade height and stop location to ensure that the tenon fits snugly in the previously formed mortises.)

3 Transfer the full-sized apron patterns to heavy stock. (We used carbon paper to copy the patterns onto posterboard.)

4 As shown in Step 2 of the drawing, position the rail-end template flush with the tenon shoulder, and trace its outline onto the outside face of each end of each apron. Center the full-sized center pattern, and trace its outline onto the front and back apron *only*.

5 For perfect rounded corners along each apron bottom, bore ½" and ¾" holes next to the marked outline where shown in Step 3 of the drawing and also where shown on the Aprons drawing. Next, bandsaw or scrollsaw the aprons to shape.

6 As shown in Step 4 of the drawing, cut a ¼" groove ¼" deep ½" from the top edge of the front, back, and side aprons.

7 Dry-clamp the four aprons between the legs to check the fit. Then, glue and clamp a side apron (C) between a pair of legs.

COFFEE TABLE

Repeat with the other side apron and two legs. Now, glue the front and back aprons (B) between the two side assemblies, checking for square. (We measured diagonally to check for square.)

8 Sand the face of the apron flush with the face of the leg shank. Then, following the techniques article, cut the eight knee brackets (D) to 1¼ × 1¼ × 1", glue them in place, and sand them to shape.

And now, for the tabletop

1 Rip and crosscut five pieces of ¾" walnut for the tabletop (E), and then joint or plane their edges so each piece has a finished dimension of 4" wide by 39" long.

2 Spread an even coat of glue on the mating edges of the 4 × 39" tabletop pieces. With the surfaces and ends flush, clamp the tabletop pieces edge to edge.

3 After the glue has dried (we left ours clamped overnight), scrape off the squeeze-out, and crosscut each end square for a finished length of 37½". Next, sand the top and bottom surfaces smooth with progressively finer grits.

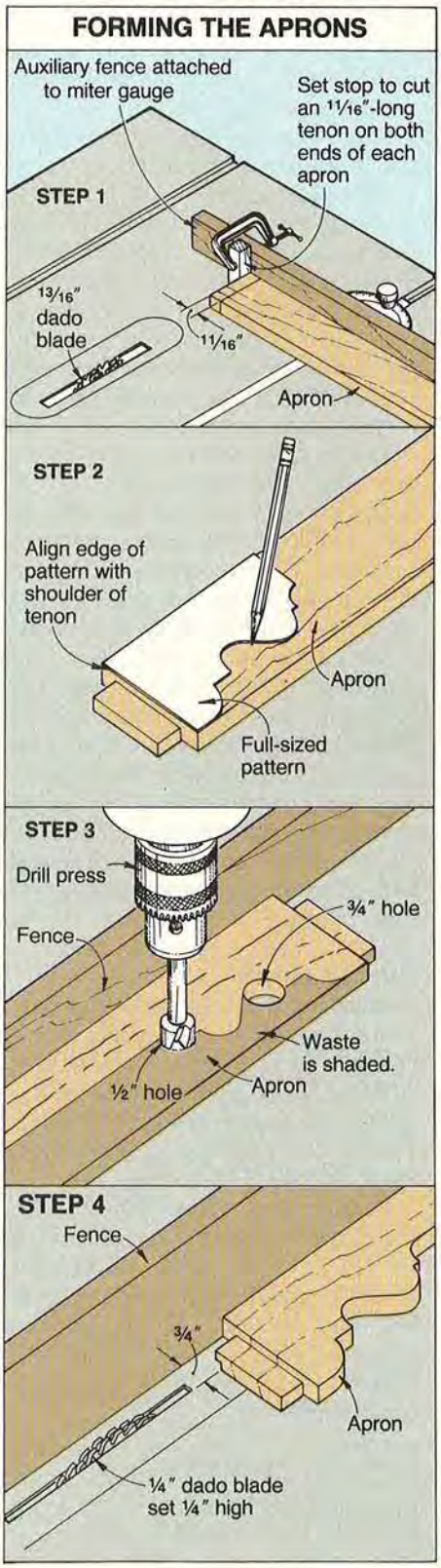
4 Mark a 1½" radius on each corner of the tabletop, and cut and sand each corner to shape.

Note: *In an effort to keep your costs down, we try to use standard tools and router bits. But some projects require a special touch. We used a ½"-shank classic table-edge bit (Freud 99-027) for the tabletop to match the high style of the cabriole legs and fancy aprons. See the Buying Guide at the end of the article for our source of bits. You, of course, can use any edge profile you prefer.*

5 In order to use the large-diameter bit featured in the next step, you'll need to make an auxiliary wood base to replace your router's subbase. (To do this, we removed the plastic subbase from our router, and traced the subbase's outline and mounting hole locations onto a piece of ¼" plywood. Then, we drilled and countersunk the mounting holes in the plywood subbase, drilled a hole in the center of the subbase big enough for the router bit to pass through, and fastened the subbase to the bottom of the router.)

6 Follow the two-step drawing on *page 44* to rout the top and bottom edges of the tabletop. (When using the large bit, we routed the top edge in two passes to minimize chipping. Lower the bit to the depth shown on the drawing for the second pass.)

Continued



COFFEE TABLE

Add the finish, and fasten the top to the base

1 To form the hold-downs (F), cut a piece of ¾" stock to 4⅛×10". Plane the piece to 11/16" thick. Using the dimensions on the drawing titled Forming the Hold-Downs, cut a ⅜" rabbet ½" deep across both ends.

2 Rip three 1¼"-wide strips from the hold-down blank. Then, using a stop for consistent lengths, crosscut two hold-downs (F) to size from each 10"-long strip.

3 Using the Hole detail accompanying the drawing titled Forming the Hold-Downs for reference, mark the locations, and drill and countersink a 5/32" mounting hole in each hold-down.

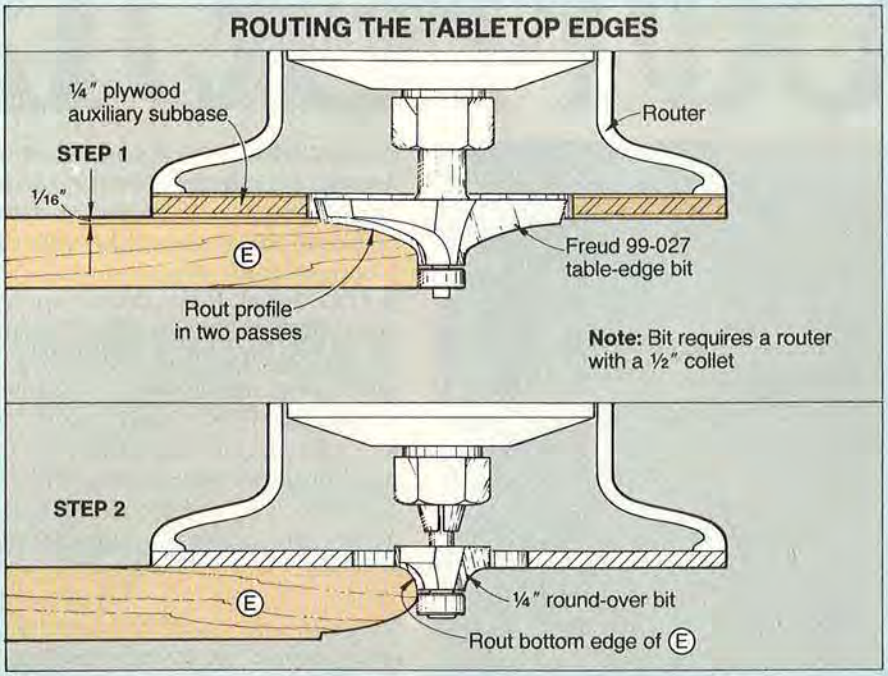
4 Finish-sand the base and tabletop. Apply the finish.

5 Lay the tabletop, top side down, on a blanket. Now, place the base top side down on the tabletop. Center and clamp the base to the tabletop, and install the hold-downs to secure the tabletop to the base. Allow an ⅛" gap between the hold-downs and aprons (see the Hold-Down detail accompanying the Exploded View drawing for reference). The hold-downs move in the grooves, allowing the tabletop to expand and contract without splitting the base or top.

Buying Guide

- **Walnut furniture squares.** Four 3×3×18" walnut pieces, rough two sides, stock no. WD192, $59 ppd. Constantine's, 2050 Eastchester Road, Bronx, NY 10461. To order, call 800/223-8087 or 212/792-1600.
- **Router bits.** Freud 99-027 carbide-tipped table-edge bit with ½" shank, $75 ppd. Add $25 for the ¼" carbide-tipped round-over bit. Puckett Elec., 841 11th St., Des Moines, IA 50309 or call 800/544-4189 or 515/244-4189 to order.

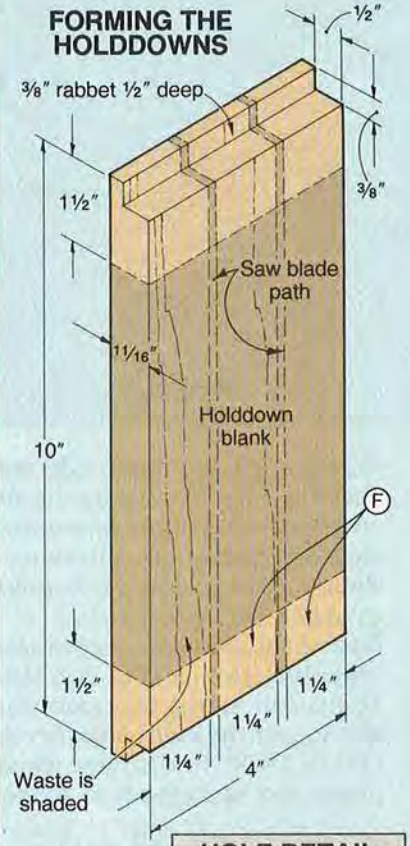
Produced by Marlen Kemmet
Project Design: Jim Boelling
Photographs: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun

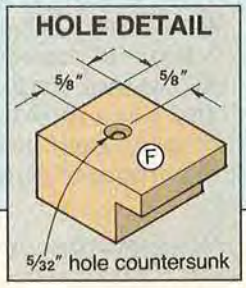


MORE QUEEN ANNE FURNITURE

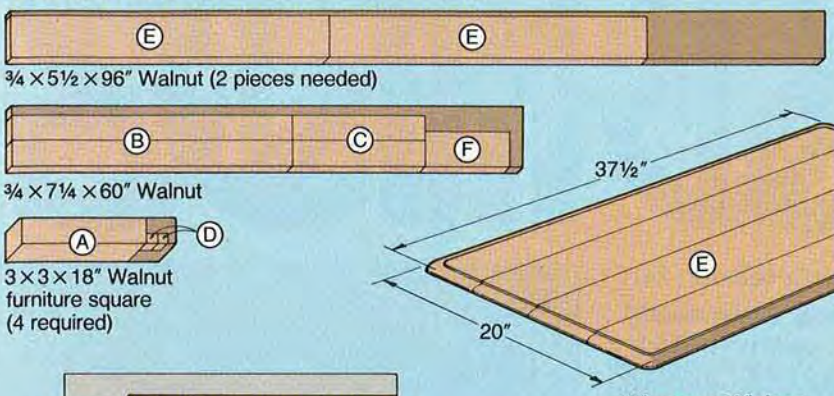
In addition to the coffee table, we've also designed and built a matching sofa/hall table, end table, and footstool. For 17×23" blueprint-style plans (exploded view drawing, full-sized leg pattern, and a bill of materials for each design) send $14.95 to:

WOOD PLANS
Dept. FP-1
P.O. Box 9255
Des Moines, IA 50306



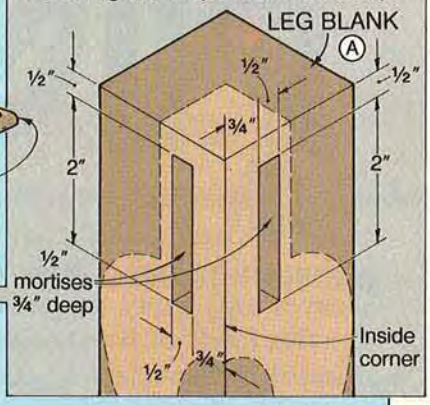


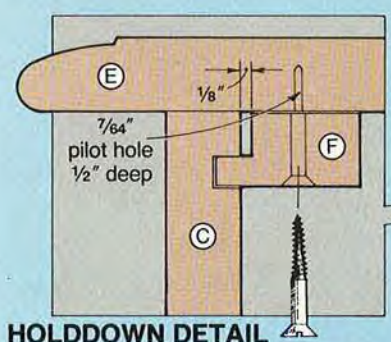
Cutting Diagram



MORTISE DETAIL

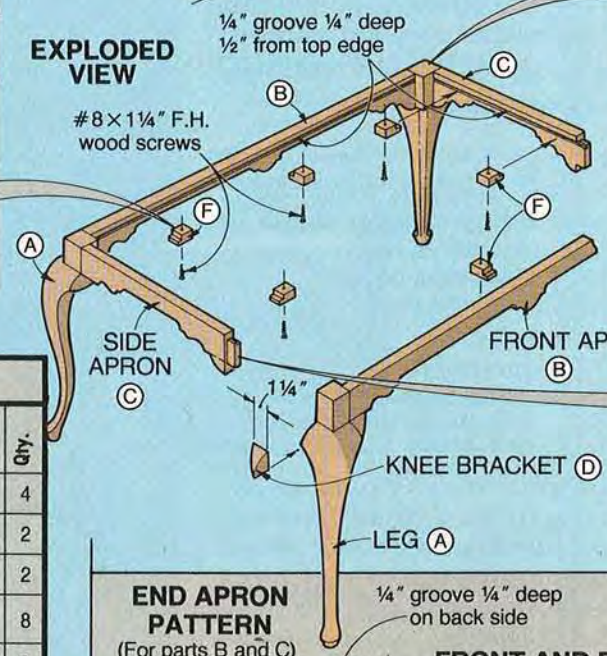
Note: Leg has not yet been cut to shape

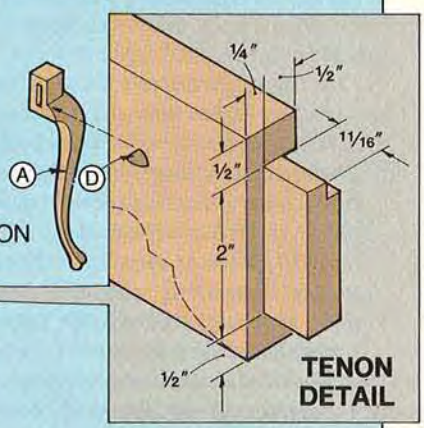




HOLDDOWN DETAIL

EXPLODED VIEW





TENON DETAIL

Bill of Materials

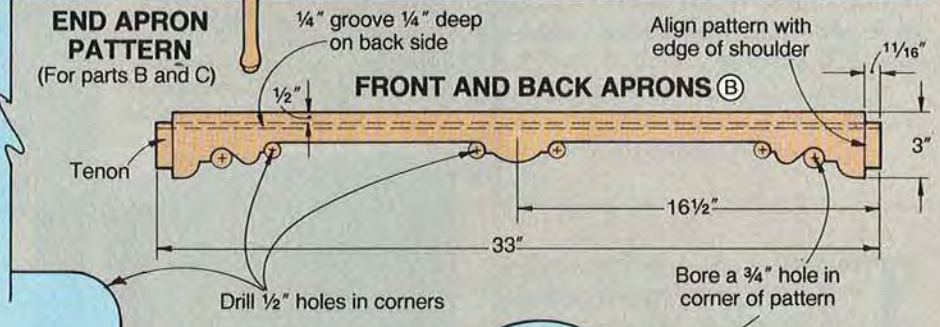
Part		Finished Size* T	W	L	Matl.	Qty.
A*	legs	3″	3″	14¾″	W	4
B	aprons	¾″	3″	33″	W	2
C	aprons	¾″	3″	15½″	W	2
D*	knee brackets	13/16″	1¼″	1″	W	8
E*	tabletop	¾″	20″	37½″	EW	1
F*	hold-downs	11/16″	1¼″	1½″	W	6

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: W—walnut, EW—edge-joined walnut

END APRON PATTERN

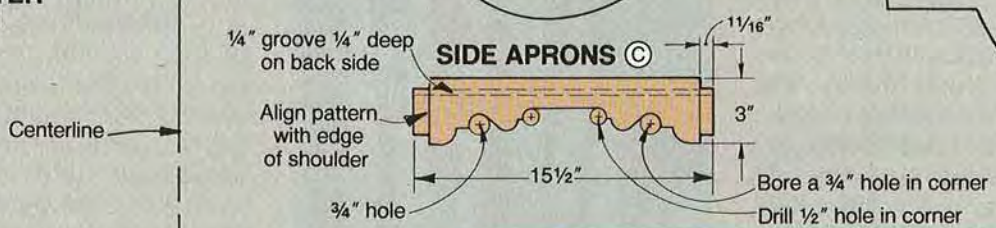
(For parts B and C)



FULL-SIZED PATTERNS

APRON CENTER PATTERN

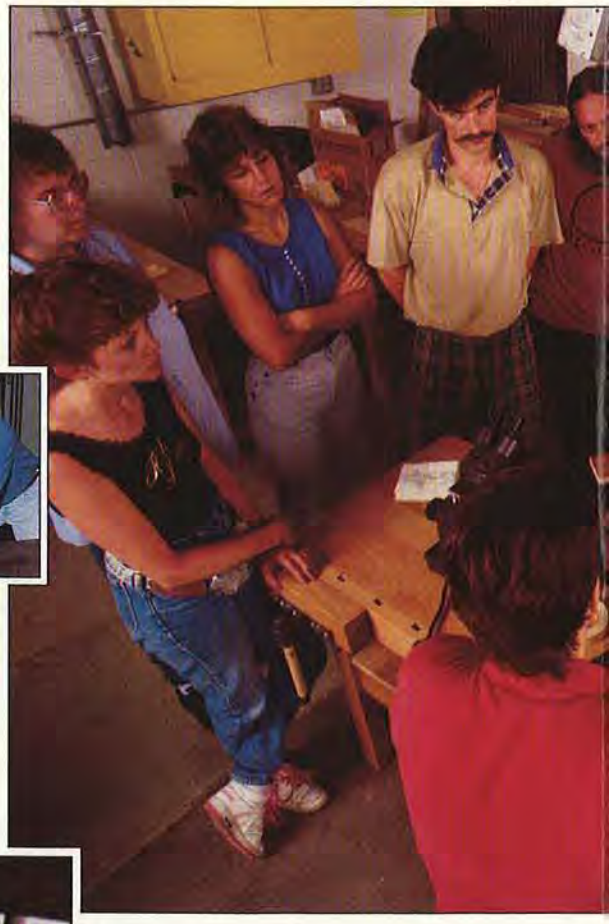
(For parts B)



WOOD® magazine goes to . . .

FINISHING

In Minnesota, there's a swell little finishing school, but students there don't attend classes in poise, polish, and using the proper fork. Instead, they roll up their sleeves and study the art of wood finishing from A to Z, with loads of hands-on lessons. Here's a story about what they learn, plus plenty of great, ready-to-use tips direct from their workshop classrooms.

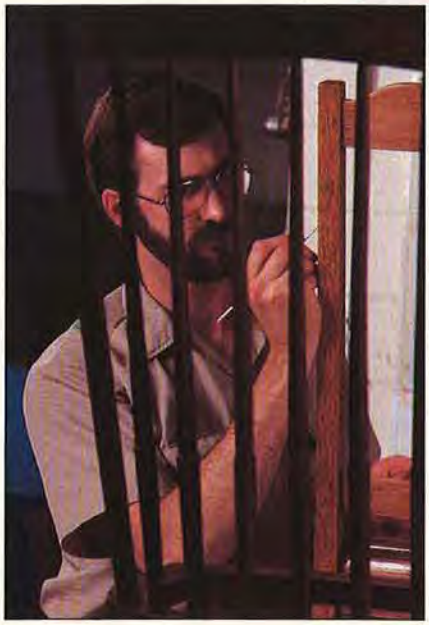


I'm living proof that an old dog can learn new tricks. And I say that after spending a couple of days attending classes at Dakota County Technical College, located in Rosemount, some 30 miles south of Minneapolis-St. Paul. In the school's wood-finishing program, I picked up lessons I'll never forget. But actually, there are no "tricks" to successful wood finishing, say the instructors. Success only requires a complete knowledge of the materials and techniques.

The dedicated two dozen or so students who complete the 10½-month program become professional wood finishers. They're prepared to work in furniture manufacturing plants, retail stores, repair shops, museums, or even their own furniture-restoration businesses. And boy oh boy, do they ever learn a lot in school!

Peter J. Stephans
Senior Editor

Print this article



Dakota County Technical College's wood-finishing students learn all there is—from patching veneer to spraying lacquer, from repairing furniture to graining wood with a fine paint brush. But it all starts with the basic material. "To be an above-average wood finisher, you first have to understand wood," explains Mitch Kohanek, 42, who teaches the finishing program's courses in wood identification, structure, and machining.

"For example: What woods need filling and what woods don't? Students must study wood under a microscope to get a better mental picture of what they are trying to accomplish." And before graduation, his students do.

"We look at all the species used in the furniture trade under the microscope," says Mitch. "We identify the tyloses [vessel bubbles] in white oak as opposed to the open-cell structure in red oak, and as opposed to the grain in mahogany. With close-grained birch and maple, for instance, students learn that they're looking at something that requires an entirely different finishing technique. The beauty of woodworking is

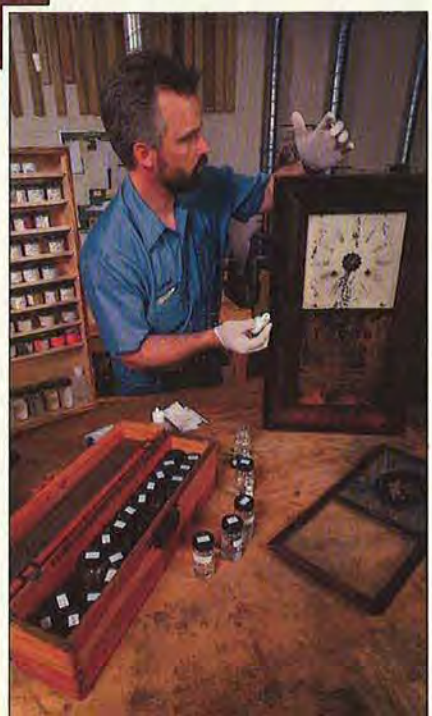
SCHOOL

Left: Dakota Tech students learn wood identification and how the different species perform in finishing. Here, instructor Mitch Kohanek presents the whys and hows of staining.

Far left: In an advanced class, Senior Editor Peter Stephano admires the graining technique that student Melanie Lunsford has perfected. With it, she subtly blends table-top repairs into the cleaned, original finish.

Opposite page, bottom: Student John Geier carefully applies graining pigment during final touchup on an oak side chair he has restored.

Below: Relying on his box of stains and colorants, instructor and master finisher Mitch Kohanek prepares to match a stain on an antique clock case.



Preparation for finishing 104

Always sand project parts to the same degree. Don't go up to 220-grit for a tabletop when you have stopped at 150 on the legs because the stain on the top will end up lighter.

Remember to replenish your sandpaper frequently. If you don't, the lighter scratches on the wood produced by worn-out paper will result in uneven staining.

Don't put too much pressure on a tack cloth; it's impregnated with varnish. The result: varnish in the wood pores will chemically react with a lacquer finish.

Once wood is prepped for finishing, leave it alone. Don't wet it with any type of liquid, such as wiping it down with mineral spirits, because you'll raise wood fibers.

that if you want to get involved with all of the species you can," Mitch adds. "But if you're a professional finisher, you're certainly going to."

Learning to participate

"If people knew more about the materials involved with wood finishing, they would understand how to react to a problem," Mitch comments. "By the time the students leave here, they will have learned to participate in the results of wood finishing rather than observe and say 'That didn't work and I don't know why.' "

For example, in a beginning course on preparing wood for the finish, students discover that sanding contributes more than smoothness. "A true pigmented wood stain relies on the scratch marks created by the abrasive," explains Jerry TerHark, 40, the other half of the teaching tandem whose classes include color theory, finishing materials, touch up, and spray technique, to name only a few.

"The pigment doesn't penetrate the wood fiber," Jerry continues, "it ends up in the sanding scratches. So, the deeper the

Continued

FINISHING SCHOOL

scratch marks—say those made by 80-grit—the darker the color will be. Move up to 220-grit, the color gets lighter because the finer scratches can't hold as much pigment." (See the class notes throughout this article for more take-home tips.)

Mitch recalls an important lesson having to do with another aspect of sanding. "I had a new student who was determined to get the most out of his sandpaper, and he put duct tape on the backing to keep it from falling apart," he says, amused. "But if he had known the components of sandpaper, he would have realized that the grit is held on by glue, and when the grit wears off, glue gets into the wood. And, because only one thing can occupy space at any one time, where he wanted stain, he had glue. He was also burnishing the wood, rather than creating scratch marks."

Jerry and Mitch's finishing students learn from mistakes—mostly those made by others evidenced in old furniture brought in to refurbish. From improper machining that allows a glue joint to fail, to improperly applied finishes that bubble and crack, students have seen them all. And by the end of the course, they cope with them all. Says Jerry, "I've seen students bring in a piece of furniture they found in a dumpster and make it into a first-rate collectible."

Mitch adds, "Everyone wants to know tricks of the trade. To me, tricks are things that may or may not work. To be a successful finisher and restorer, you must have

Advanced finishing methods
114

Don't test a stain on raw wood that hasn't been prepared (sanded) exactly like the wood in your project. It will look entirely different.

Shellac isn't a real durable finish, but it's a great sealer and compatible with lacquer. Therefore, you can seal old clear finishes still in fair shape with shellac, then recoat them with lacquer for a bright new finish.

Lacquers and shellacs rely on chemical adhesion to wood, whereas varnishes and polyurethanes must have a rough surface to grab on to. So, sand the wood accordingly.

One solvent for lacquer is lacquer thinner, and the thinner you use should be a 'perfect blend'. That is, if you're spraying one brand of lacquer, use the same brand of lacquer thinner, because it's formulated to match the lacquer.

When you put down several coats of a clear film finish, you'll never feel the wood, so you can bring out a high gloss finish with even 60-grit sandpaper. Therefore, sand only for color control, and concentrate on the finish coats for smoothness.

To avoid blotchy staining on maple and birch, first apply a wash coat made by mixing three parts solvent with one part stain.

Spray systems and techniques
102

Wood not finished on the bottom side, such as a tabletop or chair seat, will develop compression set or surface checking. That's because the moisture moves faster through the underside, where the finish doesn't exist.

Always apply finish equally to all sides of a piece of wood. For a tabletop, for instance, put two sealer coats and one finish coat on the under side. On the top side, put on two sealers and three finish coats. By the time you sand and rub down the top-side coats, top and bottom will be equal in thickness.

Opposite page, top: **Student Cindy Blom experiments with artist's oil colors to create faux (false) finishes that, at a glance, simulate marble and granite.**

Opposite page, bottom: **A small chunk of wood missing? No problem. Instructor Jerry TerHark shows how to repair the damage with auto-body filler.**

Below: **Recaning a refurbished, antique chair takes patience, as student Jody Gerling discovers. Dakota Tech students can learn upholstering, too.**

a fundamental knowledge of the products involved—how they work and how they are related."

Take what you've learned and earn

To graduate, finishing students must pass a final test, and it isn't multiple choice. "In the fourth quarter, each of my full-time students has to make a minimum of $2,000 from clients with the finishing skills they have learned," comments Jerry.

"This is based on earnings of $10 per hour. For instance," he explains, "if a student brings in a chair to repair and refinish for a customer, and that student estimates that the job will take three hours, that's $30, leaving only $1,970 to make up. But if the student underestimates the time and it takes longer, he or she will still only make $30 income towards the goal. That's how it works in real life. They have to learn."

But that close to the end of the wood-finishing curriculum, few students should miss the $2,000 mark. That's because in the process of collecting their credit hours, they've gained the skills that employers will pay for, and confidence, too.

Melanie Lunsford, a 35-year-old college graduate formerly employed in hotel management, says, "I was bored with the job I had. This work feels good, because I like wood. Now, when I go home, I'm not stressed out. I have no doubts that I can walk out of here and be successful as a professional finisher. And what's great is that I can practice it anywhere I want."

Some day, Melanie hopes to start her own furniture restoration business. When she does, every day she'll recall those lessons learned in finishing school, many of which we've presented in the boxes on these pages. You'll want to brush up on them yourself.

Preserving the finished surface 113

The wood in furniture is no longer growing and therefore doesn't need its oil replenished. A finish protects the wood from any moisture. Lemon oil only collects dust.

Today's finishes don't require special protection, such as wax. Just clean with soap and warm water, rinse with clean water, and then dry.

Clean antiques with warm, soapy water and rinse. Then apply a good carnauba wax. Shellacs and old lacquer formulas on antiques aren't nearly as resistant to water as modern finishes.

Never apply wax heavily. Dampen a cloth with mineral spirits, dip it into the wax, and apply in a circular motion. When it starts to haze over, buff immediately.

Beware of cleaners containing ammonia. Ammonia gas will penetrate a finish and eventually turn wood darker.

Want To Attend Finishing School?

For course descriptions and costs, write *Dakota County Technical College, 1300 145th St. East, Rosemount, MN 55068.* Call 800/548-5502 (from Minnesota), 612/423-2281 elsewhere.

Written by Peter J. Stephano
Photographs: Layne Kennedy
Graphics: Mike Henry

Something new for adventurous woodworkers

ACRYLIC-IMPREGNATED

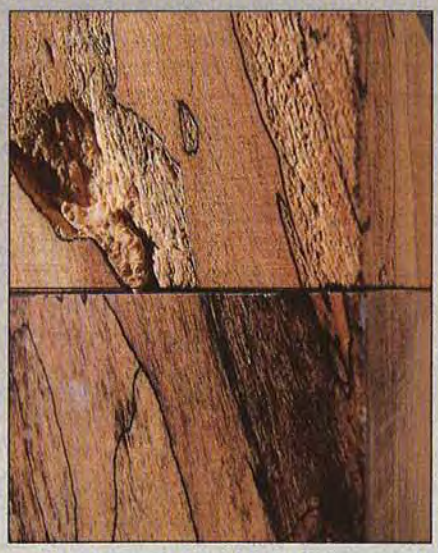
Suppose you could take a piece of soft, crumbling wood and make it hard and solid, while retaining all of its natural beauty? What if this stock proved impervious to swelling, checking, and warping? What if it resisted water, and its colors never faded? Sound impossible? Not anymore!

You can perform this "magical feat" with nearly any piece of dried wood through a process called stabilization. In fact, all of the projects shown here feature stabilized woods that were otherwise too soft or unstable to use. Let's take a closer look at this technology and see how it can work for you.

Print this article

How stabilization works

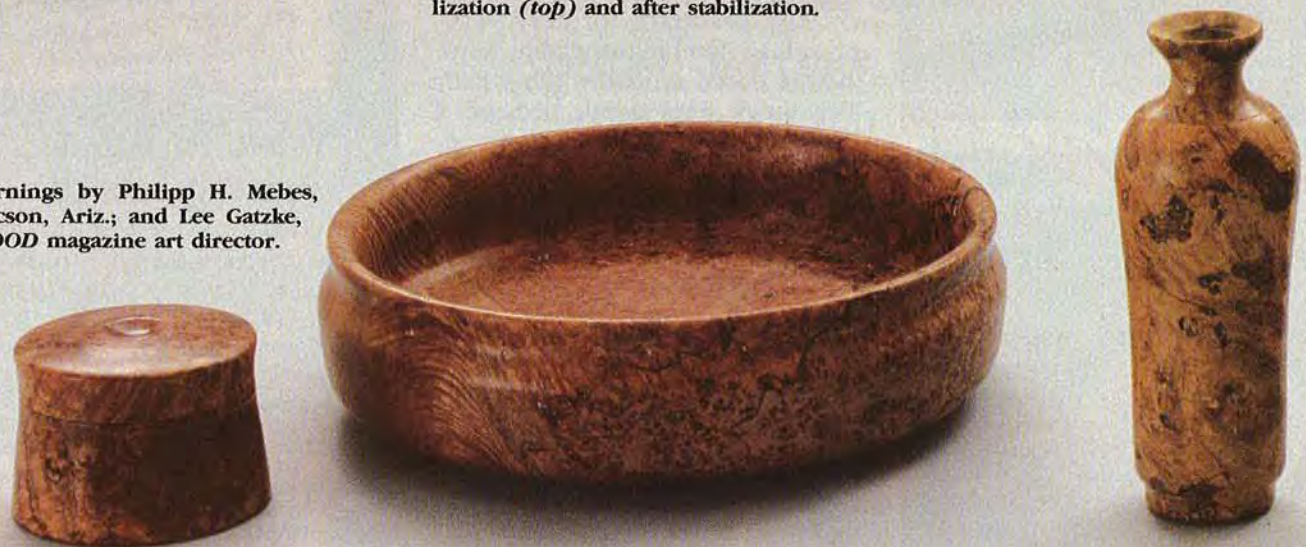
John Starr invented a process (with a patent pending) by which he forces liquid acrylic resins into wood under high pressure. The resins completely impregnate the stock, and then cure. Since starting his business—Material Stabilizing Specialists, Inc. (MSSI)—in 1990, John has stabilized over 300 wood species for manufacture into knife handles, pistol grips, boat trim, jewelry, a wide variety of turnings, and many other objects.



A piece of spalted maple before stabilization *(top)* and after stabilization.

For a fee, you can send turning squares up to 9" in diameter and 50" long to MSSI for stabilization. (Stock should be dried to at least 8 percent moisture content.) MSSI can also handle boards up to 1" thick, 12" wide, and 8' long. The price for this service ranges from $8 to $18 per pound of stock (weight before stabilizing), depending on the type of wood and its intended use. The process requires 3–5 working days. Before sending any wood to MSSI, call or write John Starr at:

MSSI
Box 219
1007 Fremont
Tombstone, AZ 85638
Call: 602/457-3183
Fax: 602/457-3069



Turnings by Philipp H. Mebes, Tucson, Ariz.; and Lee Gatzke, *WOOD* magazine art director.

WOOD

Knives by Fred Roe, Huntsville, Ala.

What stabilization does to wood
Once stabilized, your stock increases in weight by 20 to 150 percent (porous woods such as spalted maple take on more resin than dense woods such as ebony). It becomes harder, stronger, and will not change shape. As shown in the comparison photo on the *opposite page,* the color darkens slightly, similar to the way wood darkens when you apply water to it. Because the acrylic saturates the wood fibers, the pigments in those fibers cannot fade through oxidation.

What we discovered in our shop tests
During trials in the *WOOD*® magazine shop, we had good success sawing, sanding, and turning various samples of stabilized woods. Because of their hardness, our samples of spalted maple, black ash burl, and Australian lacewood required more cutting power and dulled our tools a little more quickly than nonstabilized woods. For turning, MSSI offers a special "soft formula" that makes the turning process easier on you and your tools.

Desk clock made of stabilized Australian lacewood by Jim Harrold, *WOOD* magazine managing editor.

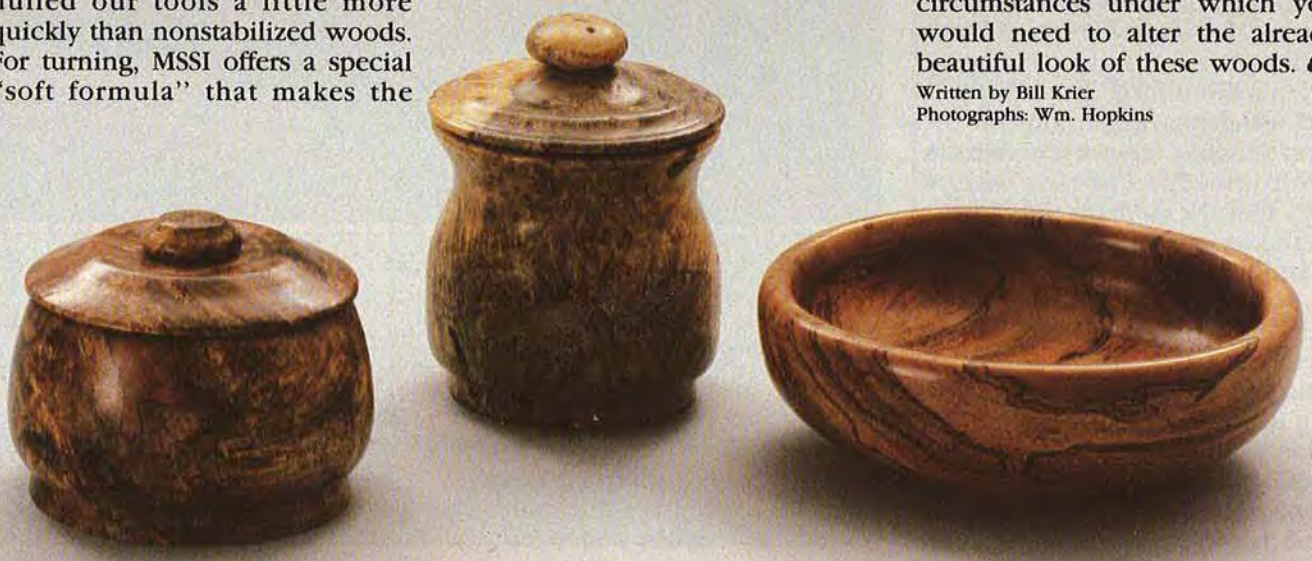
All cutting operations, especially turning, created clouds of fine dust, so be sure to wear an approved respirator while working it. Woodworker's glue held the stabilized pieces together with the same tenacity that it bonds unstabilized woods.

You don't have to apply a finish to stabilized woods. You need only sand the workpiece with a succession of 100-, 320-, and 400-grit abrasives, and then buff with a compound to bring out a deep sheen. A coat of wax protects the buffed surface. (MSSI markets a special wax for stabilized workpieces that comes with instructions. See the address on the *opposite page.)*

We achieved an even shinier surface, though (and one that doesn't require any maintenance), by sanding up to 320-grit paper and applying a water-based finish. Unlike untreated wood, the grain of stabilized wood does not raise when you apply a water-based finish.

Oil-based finishes also work, but keep in mind that these will add a slight amber cast to the natural appearance of the wood. Stabilized woods do not accept stains, but we can't imagine many circumstances under which you would need to alter the already beautiful look of these woods.

Written by Bill Krier
Photographs: Wm. Hopkins



A WOOD MAGAZINE F·A·M·I·L·Y HEIRLOOM PROJECT

CHARMING

Here's a stand-up mirror that invites a closer look. Its clean lines and wedged mortise-and-tenon construction will certainly reflect your craftsmanship. While building this mirror won't be a problem, deciding who gets it for their room could be.

Print this article

Let's start by forming the feet

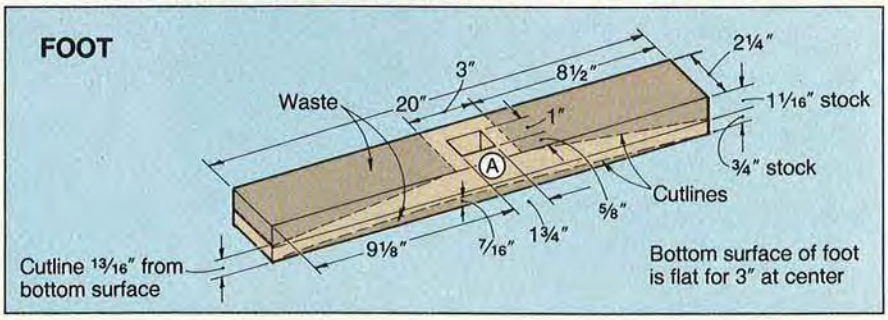
1 To make the feet (A), start by cutting two pieces of ¾" stock and two pieces of 1 1/16" (five-quarter) stock to 2½" wide by 21" long each. (We used cherry throughout.) With the edges and ends flush, glue and clamp one piece of ¾" stock to one piece of 1 1/16" stock for each foot. (Using these two different thicknesses of wood prevents the joint line from showing on the top surface after you cut the feet to shape.)

2 Scrape the glue from one edge of each foot. Then, plane or joint that edge flat, and rip the opposite edge of each foot on your tablesaw to 2¼" wide. Trim both ends square for a 20" finished length.

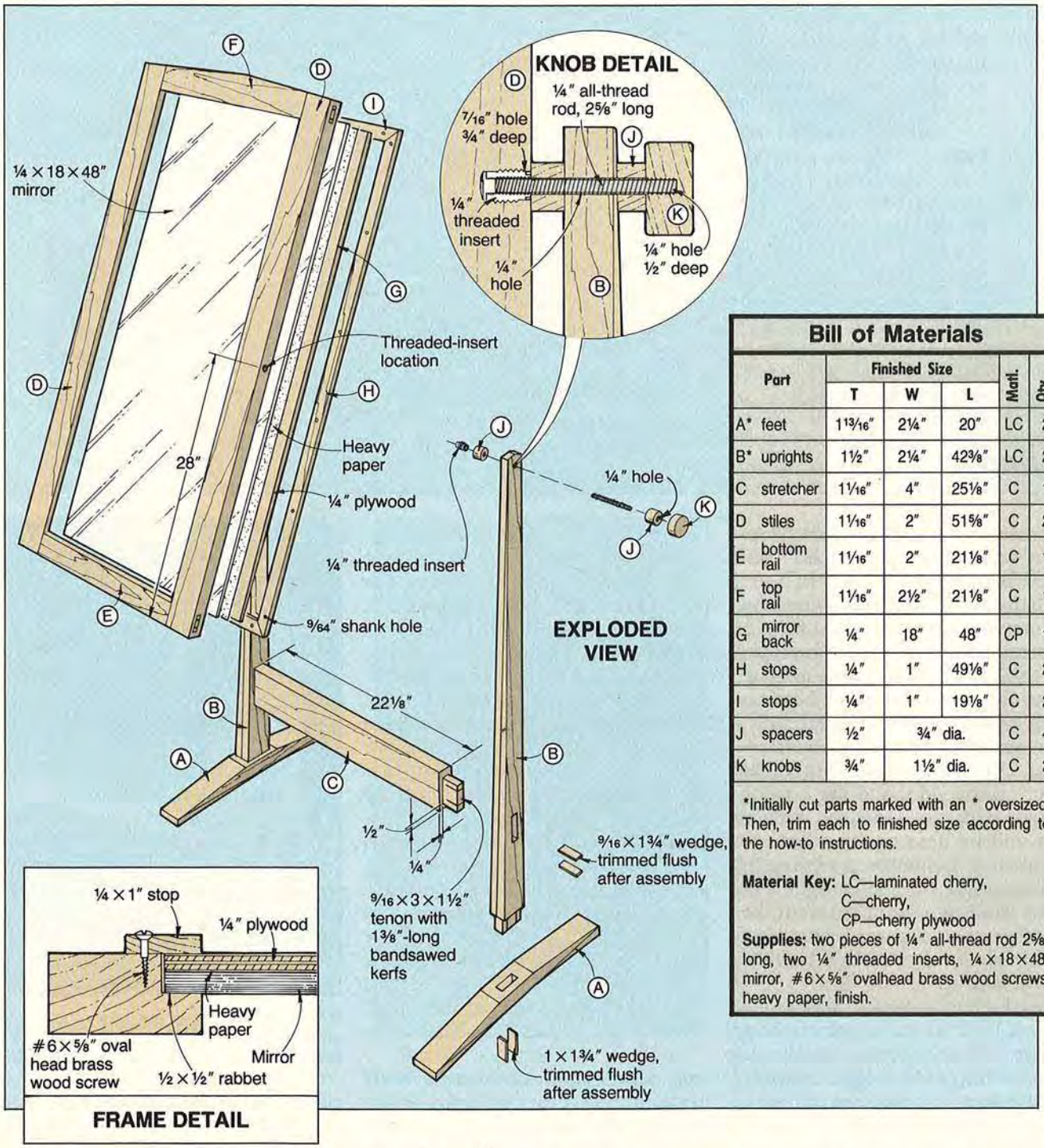
3 With the thicker wood on top, and using the dimensions on the Foot drawing for reference, mark a pair of cutlines on one edge of each foot. Next, mark the mortise on the top surface of each foot.

4 Drill holes inside the marked mortises to create rough openings. Next, use a sharp chisel and mallet to clean the mortise sides.

5 Bandsaw the feet to shape, cutting just *outside* the marked lines. Now, sand to the lines to finish shaping the feet. Save the wedge-shaped pieces of scrap—you'll use them later for the tenon wedges.



CHEVAL MIRROR



Bill of Materials

Part		Finished Size T	W	L	Matl.	Qty.
A*	feet	1 13/16"	2¼"	20"	LC	2
B*	uprights	1½"	2¼"	42⅜"	LC	2
C	stretcher	1 1/16"	4"	25⅛"	C	1
D	stiles	1 1/16"	2"	51⅝"	C	2
E	bottom rail	1 1/16"	2"	21⅛"	C	1
F	top rail	1 1/16"	2½"	21⅛"	C	1
G	mirror back	¼"	18"	48"	CP	1
H	stops	¼"	1"	49⅛"	C	2
I	stops	¼"	1"	19⅛"	C	2
J	spacers	½"	¾" dia.		C	4
K	knobs	¾"	1½" dia.		C	2

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: LC—laminated cherry, C—cherry, CP—cherry plywood

Supplies: two pieces of ¼" all-thread rod 2⅝" long, two ¼" threaded inserts, ¼ × 18 × 48" mirror, #6 × ⅝" ovalhead brass wood screws, heavy paper, finish.

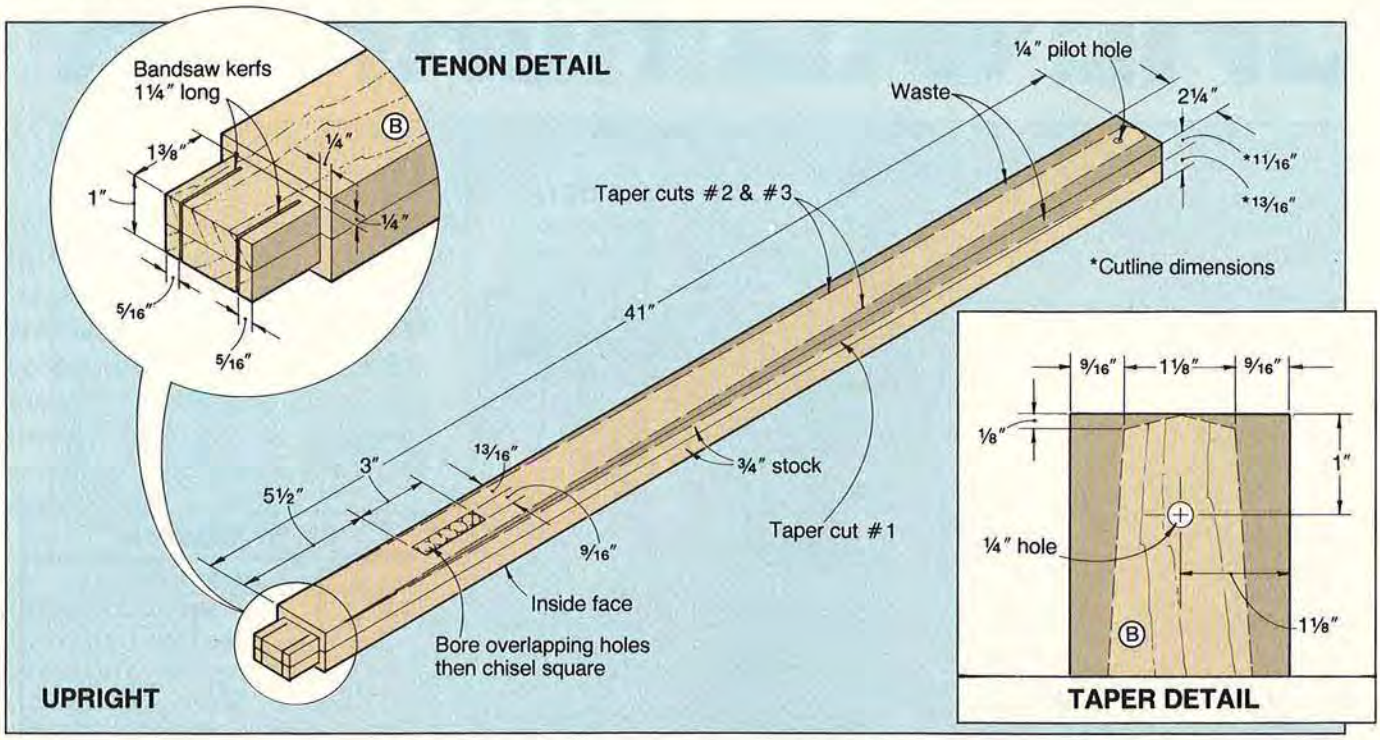
Now, machine the uprights

1 To make the tapered uprights (B), cut four pieces of ¾"-thick stock to 2½ × 43⅜". With the edges and ends flush, glue and clamp two pieces together face-to-face for each upright. Repeat with the other two pieces.

2 Scrape the glue from one edge of each upright lamination. Then, plane that edge flat. Rip the opposite edge for a 2¼" width.

Continued

CHEVAL MIRROR



3 Crosscut both ends of each upright lamination for a 42⅜" finished length.

4 Using the Upright drawing and accompanying Taper detail for reference, mark the cutline for taper cut No. 1, the tenon and mortise locations, and a ¼" pivot hole on both uprights. Measure carefully; you want the uprights to be identical. Notice that the uprights taper on the sides and the outside surface. (Do not taper the surface that will be next to the mirror.)

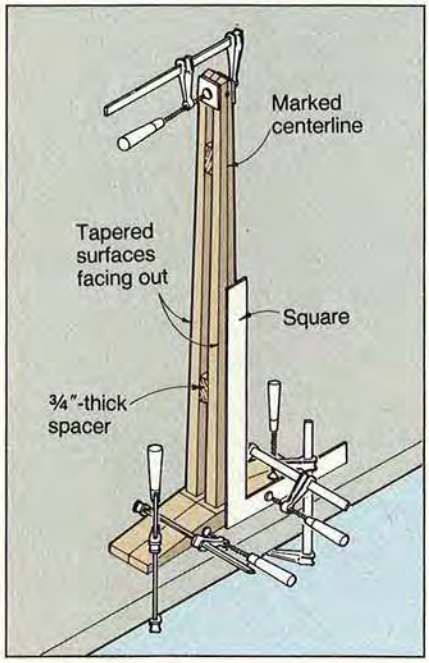
5 Measure the mortise opening in the feet, and cut the upright tenons to fit. Be careful not to cut the tenons too small; you want them to fit tight in the mating mortises in the feet.

6 Mark the locations, and cut a pair of kerfs in each tenon where shown on the Tenon detail accompanying the Upright drawing.

7 Drill the ¼" pivot hole in each upright where marked.

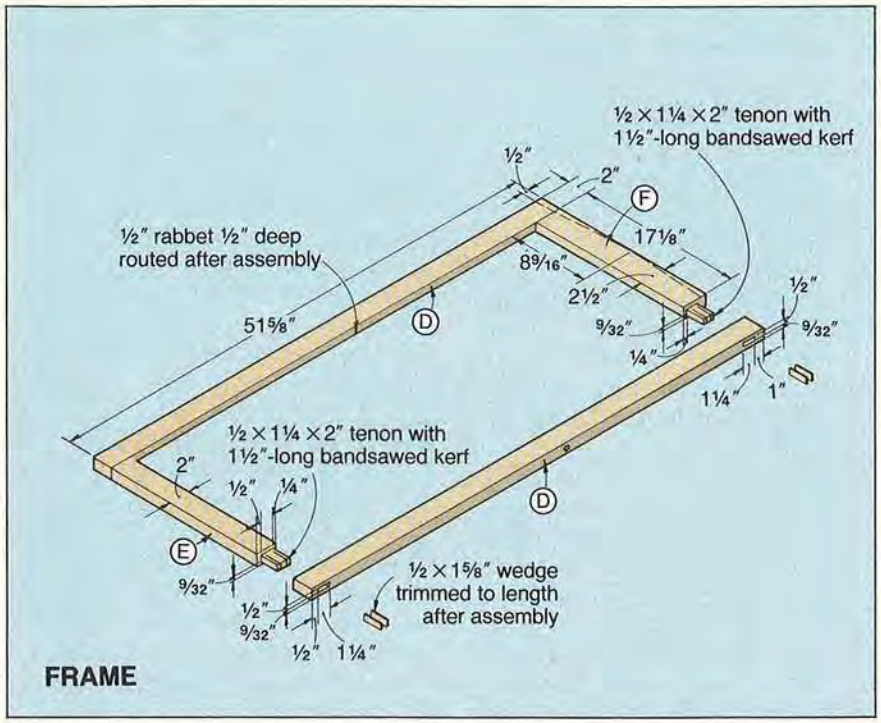
8 Drill overlapping holes and chisel the sides clean to form a mortise in each upright.

9 Following the three-cut procedure shown on the Upright drawing, make taper cut No. 1 and sand the cut edge smooth. Mark the lines for taper cuts No. 2 and No. 3, make the cuts, and sand these edges smooth.



10 Mark a vertical centerline on the outside tapered face of each upright. Glue and wedge one upright into each foot. Clamp the two assemblies together with the edges and ends flush as shown in the drawing at *left*. Use a framing square to adjust the uprights, making them perpendicular to the bottom of the feet.

Mount a straight screwdriver bit into your drill press, and turn the chuck by hand to drive the threaded inserts.



FRAME

Next, cut the stretcher, and join the uprights

1 Cut the stretcher (C) to size. Measure the mortises in the uprights, and cut a tenon on each end of the stretcher where shown on the Exploded View drawing.

2 Cut a pair of kerfs in each tenon. Cut the wedges to size plus ¼" in length.

3 Glue the stretcher between the two upright/feet assemblies. Inject a bit of glue in each tenon kerf, and drive the wedges. Wipe off the excess glue with a damp cloth. Check for square, ensuring that the distance between the uprights is consistent from the top of the uprights to the stretcher. Trim and sand the tenon wedges flush.

Cut the frame parts, and assemble them

1 Cut frame parts (D, E, F) to the sizes stated in the Bill of Materials.

2 Mark the locations and cut mortises in the stiles (D) where located on the Frame drawing.

3 Mark the centerpoints, and drill a 7⁄16" hole ¾" deep in each stile for the threaded insert. Now, as shown in the photo at *left*, drive a ¼" threaded insert into each hole.

4 Form tenons on the ends of the bottom rail (E) and top rail (F) to fit snugly into the mortises. (We attached an auxiliary wood fence to our miter gauge and a dado blade to our tablesaw. Then, we used the wood fence to support the rails while cutting the tenons with the dado blade.)

5 Using the wedge-shaped scrap left from cutting the feet to shape, cut eight tenon wedges.

6 Glue the frame, checking for square. Glue the wedges in place, and trim and sand them flush with the outside of the frame.

7 Rout a ½" rabbet ½" deep along the back inside edge of the frame. To minimize splintering, do this in two passes, lowering the bit to ½" for the second pass.

8 Mark the cutlines across the top rail (F) and top ends of the stiles (D) where shown on the Frame drawing, and cut and sand the frame top to shape.

9 Measure the opening, and cut the backboard (G) to size. (We used ¼" cherry plywood.)

10 Cut the mirror stops (H, I) to size (we resawed thicker stock), miter-cutting the ends. Drill and countersink mounting holes through the stops for ease in attaching to the mirror frame later.

It's time to add the locking knobs

1 With a compass, mark four ¾"-diameter circles on a piece of ½"-thick cherry for the spacers (J) and two 1½"-diameter circle knobs (K) on ¾" stock.

2 Drill a ¼" hole through each spacer at each centerpoint used to mark the circles. Drill a ¼" hole ½" deep centered in each knob.

3 Bandsaw the spacers and knobs to shape. Sand the cut edges smooth (we used a disc sander).

4 Cut two pieces of ¼" all-thread rod to 2⅝" long. Epoxy one end into the hole in each knob.

Finish it up, and add the mirror

1 Finish-sand the stand, frame, backboard, and stops. Stain and finish as desired.

2 Cover your workbench with a blanket, and position the mirror frame face down on the blanket.

3 Cut paper (we used freezer paper) to the size of the mirror. Place the paper between the mirror and plywood to protect the silvered back of the mirror from abrasion or scratches.

4 Insert the mirror, paper, and backboard into the rabbet in the mirror frame. Tape the stops (H, I) in place. Using the previously drilled shank holes in the stops as guides, drill 3⁄32" pilot holes 3⁄8" deep into the mirror frame. Now, screw the stops in place to secure the mirror and plywood.

5 With a helper, hold the mirror frame in place, slide the threaded knobs through the holes in the uprights and spacers, and screw them into the threaded inserts in the mirror frame. Tighten the knobs slightly to prevent the mirror from swinging too freely.

Produced by Marlen Kemmet Project Design: James R. Downing Photographs: Hopkins Associates Illustrations: James A. Downing; Bill Zaun

AIRBRUSH

Many of us think of airbrushes as tools for artists, but most woodworkers can benefit from owning one. Why? An airbrush will apply most any oil-based or water-based paint, clear finish, or stain, and do it with greater control than other application methods.

With a little practice, you can even use an airbrush to fade together paint colors (as shown in the parrot's tail *below*) or stain sapwood so it blends into surrounding heartwood. You can buy an airbrush with accessories for less than $60, and power it with the tiniest of compressors. And, an airbrush takes up little space, creates a small amount of overspray, and cleans up easily.

What type of airbrush do you need?

For most woodworking, a single-action airbrush such as the Paasche model H shown in this article and in the drawing *opposite page* will work fine. (Other makers produce similar models; see the Buying Guide *opposite page* for a source for the Paasche airbrush.)

Single-action airbrushes have an air-release button that controls air and fluid flow simultaneously. For an additional $15–$20, you can buy a dual-action airbrush that has separate controls for air and fluid flow. The dual-action airbrush gives you greater control over the amount of finish being applied, but takes more time to clean because of its additional internal parts.

Airbrushes require 20–30 psi of pressure, and run off of any compressor with an air-storage tank. Or, you can opt for a can of compressed air (about $5 for 14 oz.). If space is at a premium in your shop, you can purchase compressors especially made for airbrushes that only weigh about five pounds ($150 and up).

Print this article

How to put an airbrush to work in your shop

No matter what type of woodworking you do—furniture, toys, carvings, or miniatures—an airbrush can be a big help in your finishing tasks. Here's how we put one to use in the *WOOD®* magazine shop applying three different types of finishes.

• For painting

An airbrush gives you great control over the amount and placement of paint, at a cost far below aerosol paint cans. As shown on the parrot mobile *below left*, you can easily fade and blend together colors for an eye-catching look. You can cut your masks from any stiff paper product.

• For applying clear finishes

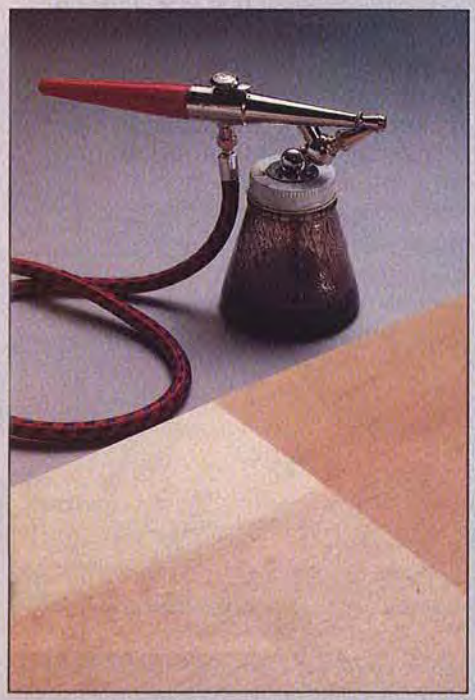
An airbrush will handle projects big or small. We finished the dump truck *below* in several minutes using polyurethane thinned with 10 percent paint thinner.

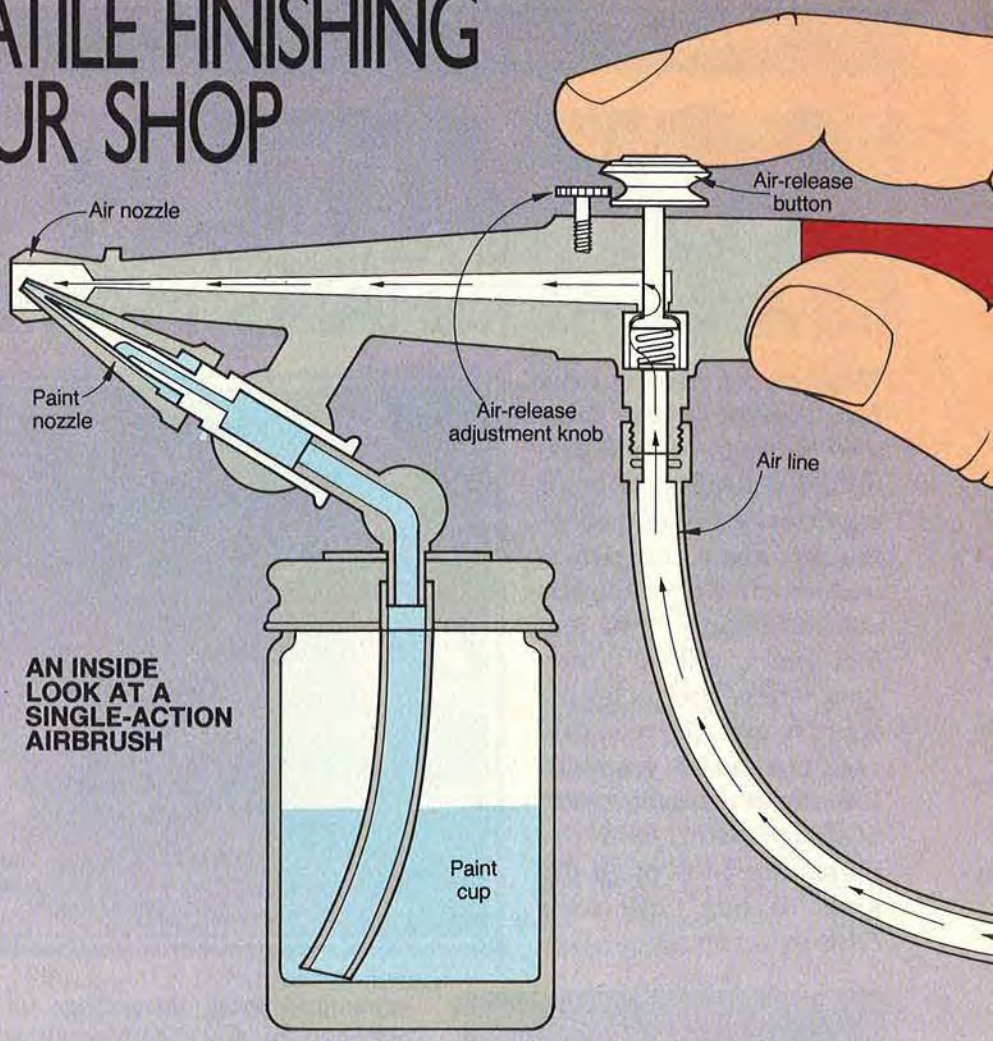
A SUPER-VERSATILE FINISHING TOOL FOR YOUR SHOP

For large projects with hard-to-reach areas, such as the outdoor chair *below*, we sprayed between the slats with an airbrush, and then coated the entire project with a conventional spray gun. We used spar varnish thinned 25 percent with mineral spirits.

• For staining

With the help of an airbrush, you can evenly stain otherwise troublesome woods such as pine. And, because of your application control, you can blend sapwood and heartwood as shown in the pine sample *below*.





AN INSIDE LOOK AT A SINGLE-ACTION AIRBRUSH

Tips on getting the most out of your airbrush

Operating an airbrush is a pretty simple affair. Basically, you just connect the paint cup and air supply to the airbrush, then press the air-release button to begin spraying. You can control the amount of finish being dispensed by changing the air pressure and adjusting the paint nozzle. For most paints and varnishes, hold the airbrush about 6″ from the work surface.

Any airbrush you buy will come with instructions, but here are a few tips we've found especially important:

- To avoid spattering, briefly spray the airbrush off to the side before spraying your workpiece.
- Spray light coats and build your finish over several applications rather than applying one or two heavy coats. Heavy coats may run or form pools.
- If the flow of finish through the airbrush slows, thin the finish slightly. Run some pure thinner through the airbrush to clean it out before resuming. (We keep thinner in an extra bottle just for this purpose.)

Buying Guide

- **Single-action airbrush,** available at art, auto-paint, and craft stores nationwide. Or, you can buy the Paasche model H set with a 6′ braided hose, ¼-oz. cup, 1- and 3-oz. bottles, and three tips for thin- to heavy-bodied finishes, $59.95 ppd. from The Art Store, 600 Harding Rd., Des Moines, IA 50312. Call 800/652-2225.

Written by Bill Krier with Jim Downing
Photographs: Hopkins Associates
Illustration: Kim Downing; Mike Henry

Collector's Edition

Print this article

SCRATCH AWL

A CRAFTSMAN'S MARKING TOOL

Whenever a project calls for accurate layout lines and precisely marked measurements, lots of experienced woodworkers put away the pencil and reach for a scratch awl. Somehow, you just feel more like a craftsman when you pick up a scratch awl. Here's one you can build yourself. It features a sturdy shaft, a sharp point, and the handsome look of all the tools in our Collector's Edition series.

Tools and Supplies
½" gouge
½" skew
⅛" parting tool

Walnut stock, 2×2×4"
Steel rod, ¼" dia. × 6½" long
Brass flare nut, ¼"
Brass drawer pull
(For a kit containing a stainless steel rod and brass parts, see our Buying Guide.)

Lathe speeds (rpm)
Roughing: 600-900
Filing flare nut: 600-900
Finishing, sanding: 900-1,600

Locate and mark the center on each end of a 2×2×4" walnut turning square. With a ⅛" brad-point bit mounted in a drill press, drill a pilot hole 1½" deep in one end. Center-punch the other end.

Mount the block between centers with the drilled end at the headstock. Round the stock down with the gouge, and then mark lines 7/16" and 2" from the tailstock end of the block.

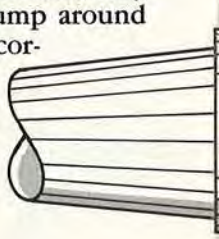
Turn to the shape shown on the Cutting the Tenon drawing, *opposite page*, leaving a slightly oversized tenon. Mark the turning and the drive center with paint or a marker so you can align them to remount the turning. Now, remove the workpiece from the lathe.

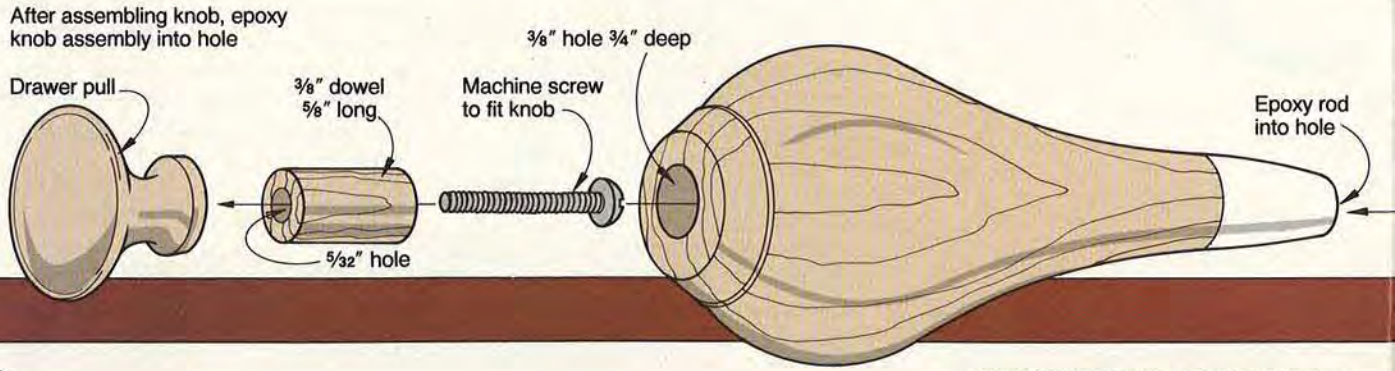
Add a bit of brass

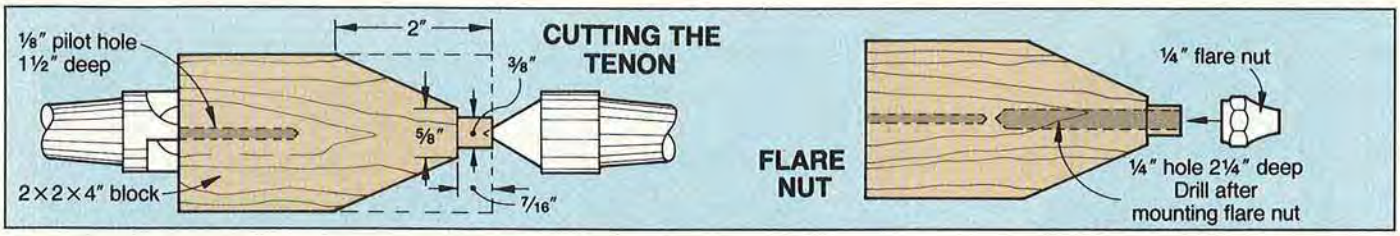
Try to thread a ¼" brass flare nut onto the tenon. If the nut won't screw on, return the workpiece to the lathe and shave a bit off the tenon. Test and turn a little at a time until the flare nut fits the tenon snugly. Then, coat the inside of the fitting with epoxy and thread it onto the tenon.

After the epoxy cures, put the turning back on the lathe to file the wrench flats off the flare nut. (An 8- or 10-inch bastard-cut mill file does this job well.) File to a smooth contour, removing as little metal as possible—the threads that are cut on the inside of the nut make the brass thin in this area.

Grip the file firmly by the handle and the other end. Take it easy at first; the file will jump around quite a bit until the corners are rounded. Remove the file marks with progressively finer sandpaper, 100-grit through 320-grit.




After assembling knob, epoxy knob assembly into hole
Drawer pull
⅜" dowel 5/8" long
5/32" hole
⅜" hole ¾" deep
Machine screw to fit knob
Epoxy rod into hole



Copy the profile from the full-sized template, *below,* onto poster board and cut it out. Now, turn the handle to final contour. The ½" gouge will do the job, except for the top shoulder—cut that with your parting tool.

Shape the wood at the small end to match up to the brass nut, but be careful not to run your gouge into the metal. When the shape is right, make a pass with your skew chisel to smooth the surface. Sand with 150-, 220-, 320-, and 400-grit sandpaper. Polish the brass with 400- and 600-grit. Remove from the lathe.

Topping off the handle

With a ¼" brad-point bit and a drill press, bore the shaft hole 2¼" deep from the brass-trimmed end. Turn the handle around, and drill a ⅜" hole ¾" deep at the top.

Cut a ⅜" dowel ⅝" long. Find and mark the center on one end, and then drill a 5/32" hole through the length of the piece.

Coat the attaching screw for a round brass drawer pull with epoxy and push it through the hole. Apply epoxy on top of the dowel, and then thread the pull onto the screw. Then, epoxy the dowel into the handle hole.

Getting to the point

***Note:** Sparks will fly as you make the blade. To be on the safe side, clean the sawdust from your sander, and don't run your dust collector while grinding the steel rod. Cool the blade with water as needed and wear eye protection.*

Chuck a 6½" length of ¼" steel rod into your portable electric drill. Then, turn on your stationary disc/belt sander, and bring the rotating rod against the moving abrasive to taper it. Hold the drill at a slight angle to the sander and aim it so that the abrasive moves away from the rod end.

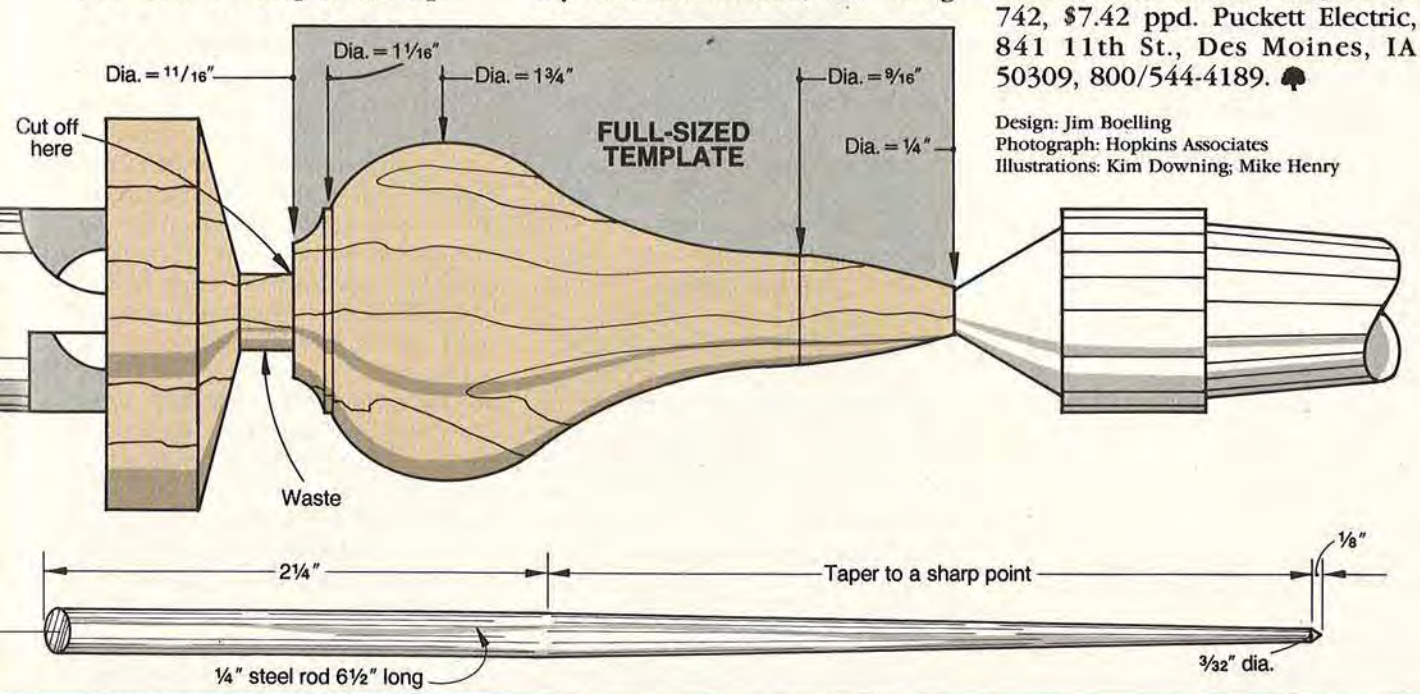
Polish the shaft with 150- through 600-grit sandpaper, and then grind the final ⅛" at the tip to a sharp point by holding the drill at a steeper angle. Epoxy the finished blade into the handle.

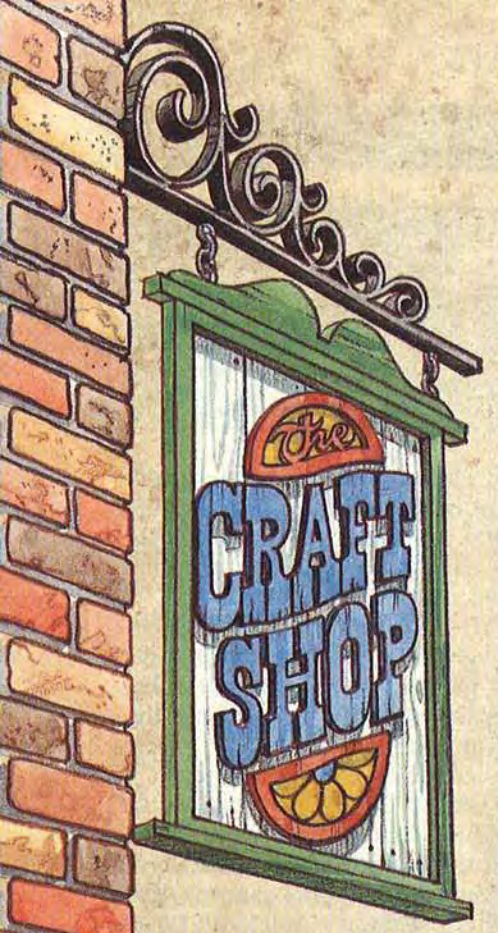
Mask off the brass knob, brass nut, and blade, and then apply walnut stain and filler to the handle. Spray on three coats of clear lacquer, rubbing it out with 0000 steel wool and furniture wax. Finally, peel off the tape and polish the shaft, brass nut, and knob with a metal polish.

Buying Guide

● **Metal kit.** Brass knob, flare nut, ¼×6½" stainless steel rod, kit no. 742, $7.42 ppd. Puckett Electric, 841 11th St., Des Moines, IA 50309, 800/544-4189.

Design: Jim Boelling
Photograph: Hopkins Associates
Illustrations: Kim Downing; Mike Henry





COUNTRY QUILT

Here's a nice solution to an old dilemma: how to store a quilt yet still enjoy its beauty. With our on-wall hanger, you'll be displaying your favorite coverlet whenever you're not using it to keep warm.

Print this article

***Note:** Our walnut hanger holds a 44"-wide quilt. If your quilt is a different size, adjust the length of part A to match its width. Then, make part C 2¼" longer than A and part D ⅛" shorter than A.*

Joint one edge of three boards, one that measures 1×6×60", one 1×6×48", and one 1×4×48". Rip the long 1×6 to 4¼" wide and the short one to 4⅝" wide.

Crosscut the 4¼" board to 44" for the back (A). Cut two 4¼" lengths from the cutoff for the endpieces (B). Cut the 4⅝" board to 46¼" for the top (C). Now, bevel-rip the 1×4 at 45° to 2⅞" wide. Trim it to 43⅞" for the hanger bar (D).

Bandsaw a 1"-radius curve on each front corner of the top and on the lower front corner of each endpiece. Then, refer to the Routing drawing, and rout along the front edge and both ends of the top with a ¼" round-over bit. Rout the bottom the same way.

With the same setup, rout the front edge and bottom of each endpiece *on one side only.* After routing one, be sure to rout the other on the opposite face so you'll have a left end and a right end. Change the bit, and rout ⅜" round-overs along the unbeveled edge of the hanger bar.

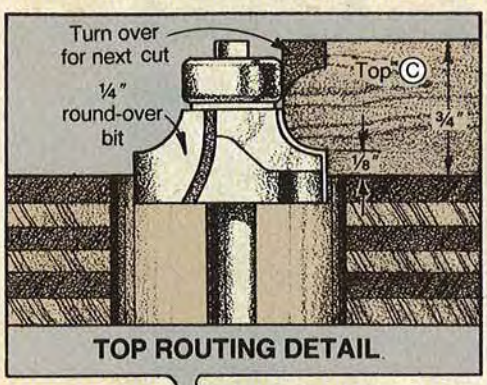
Refer to the End View and Exploded View drawings to mark locations for the pivot-pin holes. Also mark the dowel holes to join the endpieces to the back.

With a ⅜" brad-point bit, bore ⅝" deep on the inside face of each endpiece and the ends of the hanger bar. Gauge the depth of the pivot-pin holes carefully to minimize hanger bar end-play. Drill 1" deep into the ends of the backpiece. Keep the holes straight with a drill press or doweling jig.

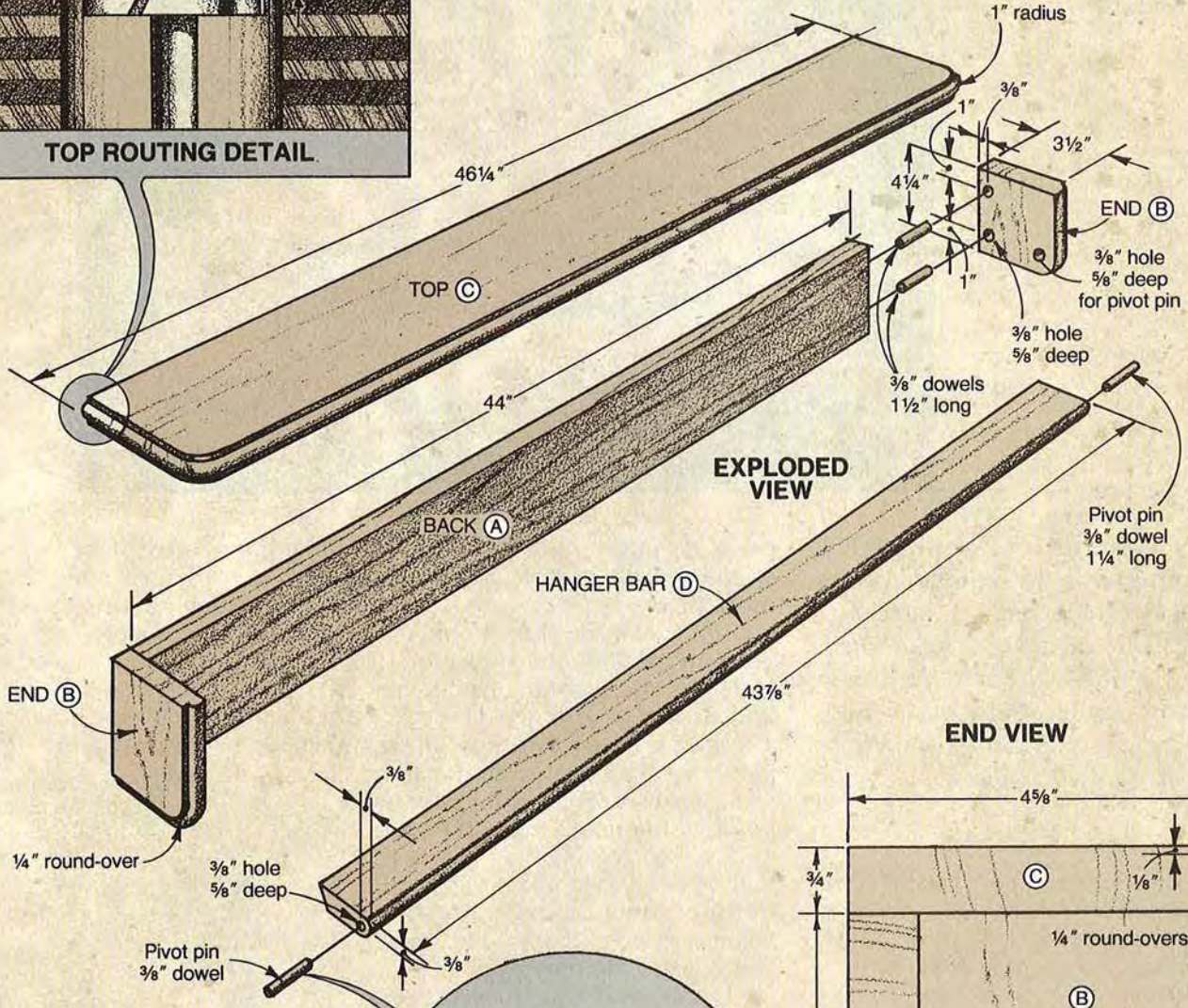
Chuck a 1¼" length of ⅜" dowel into your drill press, and sand one end to a slightly smaller diameter (see Pivot Pin detail). Make two pins.

Glue a pivot pin into the hole in each endpiece (see Exploded View drawing). Insert the pin to the shoulder. With dowels and glue, attach one endpiece to the back. Place the hanger bar over the pivot pin with the bevel to the bottom, and then attach the

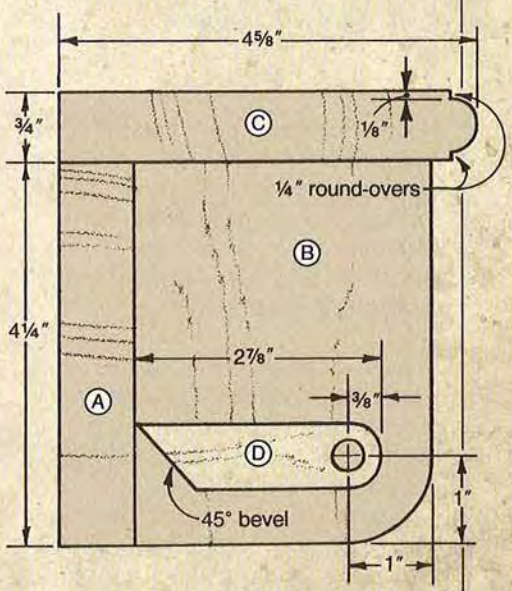
HANGER For displaying your handmade treasures



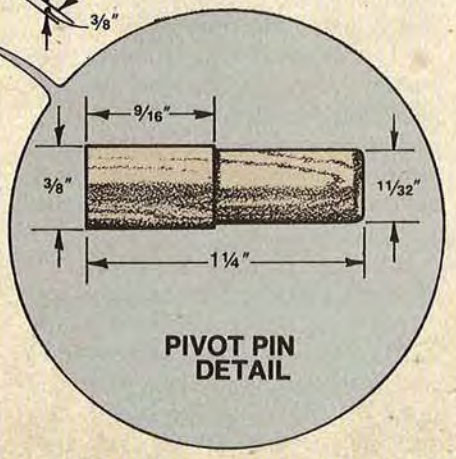
TOP ROUTING DETAIL



EXPLODED VIEW



END VIEW



PIVOT PIN DETAIL

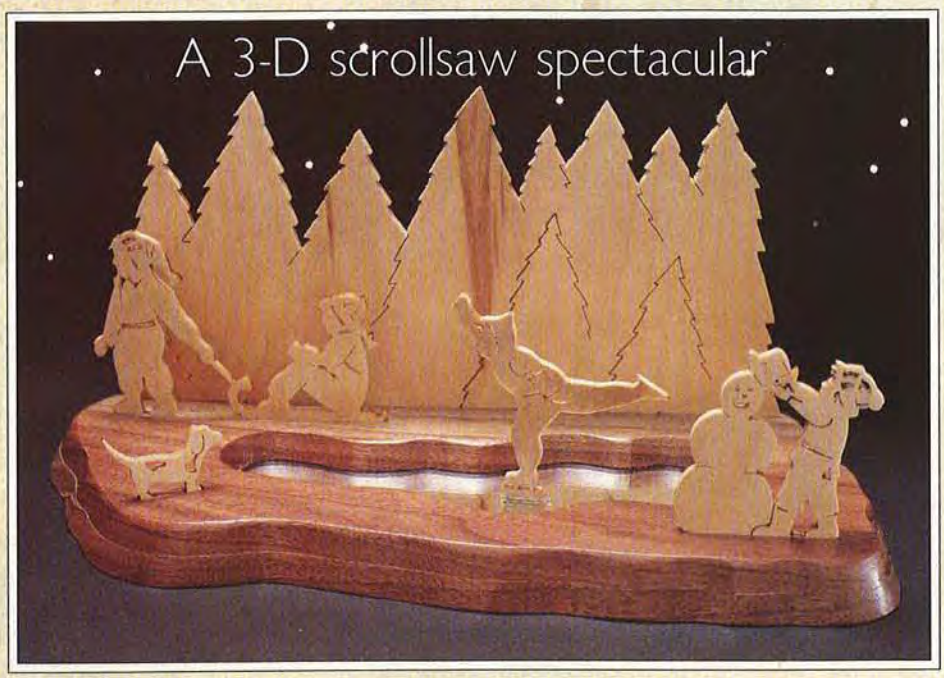
other endpiece. Do not glue the hanger bar to the pivot pins.

Mark the center of the top's rear edge and the back's rear face, and then glue the top in place, carefully aligning the center marks and the back edge. Clamp until set. Finally, apply a clear oil finish.

Design: James R. Downing
Photograph: Hopkins Associates
Illustrations: Jamie Downing; Jim Stevenson

WINTER WONDERLAND

A 3-D scrollsaw spectacular



In addition to the three R's, youngsters in colder climes study the three S's—sleddin', skatin', and snowman buildin'. These hearty children show their skills on a winter's eve; you can show yours with your scrollsaw.

Print this article

Note: *Re-create our winter scene with two ¼×5½×12" pieces of walnut, an 8×10" piece of ⅛" Baltic birch plywood, and a 2½×7" mirror ⅛" thick. The small inside cuts require plain-end scrollsaw blades.*

Attach a photocopy of the full-sized Base pattern, *opposite page,* to one piece of walnut with rubber cement or spray adhesive. Tilt your scrollsaw table to 30°.

Drill a ½" hole inside the pond outline, and thread the blade through it. (We used a #5 blade, .038×.016", with 12.5 teeth per inch.) Cut out the inside of the pond, keeping it on the low side of the scrollsaw table. Next, set the saw table to 90°.

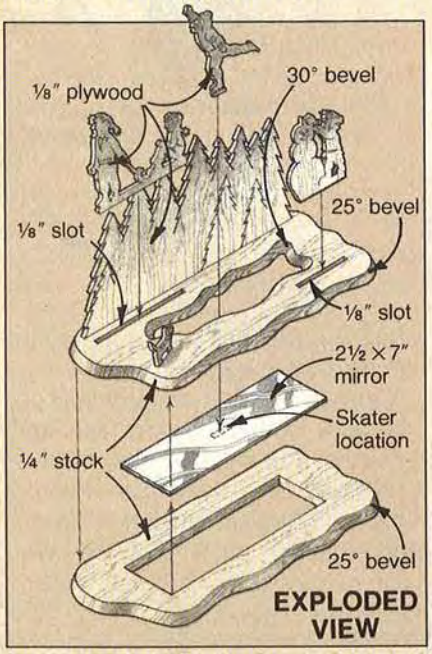
Drill 1/16" blade start holes for the four slots in the upper base part. Cut the slots to match the thickness of your plywood.

Stack the piece you just cut on the other piece of walnut, and trace around the inside of the pond with a pencil. Then, lay out a 2⅝×7⅛" rectangle on the bottom layer to encompass the pond outline you just drew. Drill a blade start hole, thread the blade, and cut out the opening.

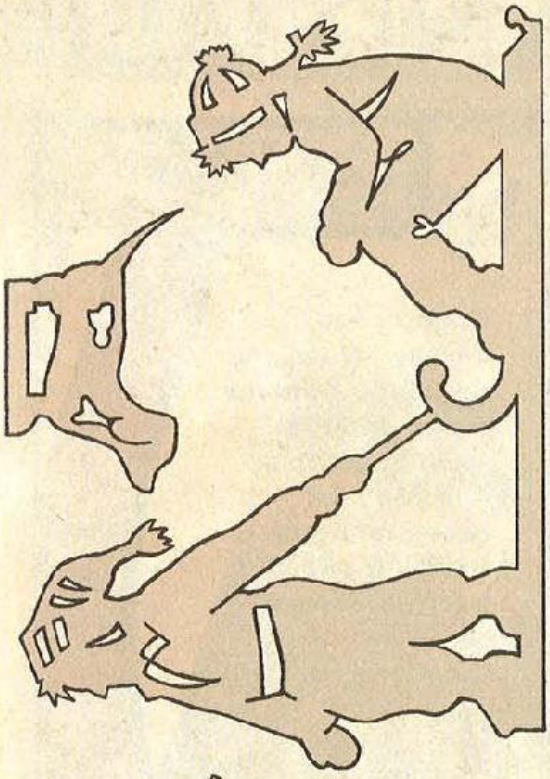
Glue the two walnut pieces together, with the pattern on top. Tilt your scrollsaw table to 25°, and then cut around the pattern outline. Keep the patterned piece on the high side of the saw table as you cut.

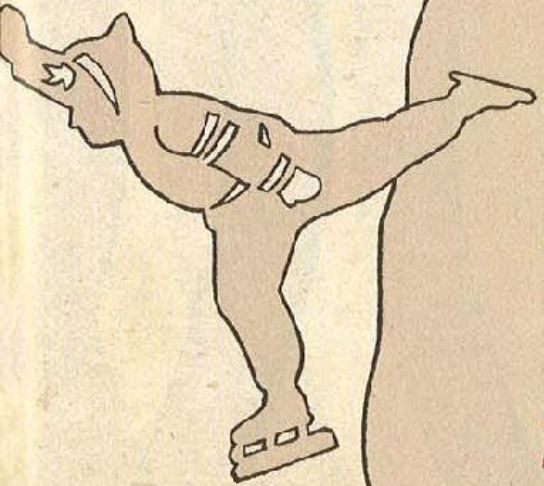
Transfer the full-sized patterns for the figures and trees (*page 72*) to your plywood. Drill 1/16" blade start holes, return the saw table to 90°, and cut, starting with the small inside areas. Test-fit the cut-outs in the base slots, and then glue them into place. Apply a clear spray finish such as Deft Wood Finish to the assembled scene and the skater.

From the bottom, fasten the 2½×7" mirror in place with a bead of hotmelt glue. Then, glue the skater into place.



Design: Harlequin Crafts Photograph: Hopkins Associates Illustrations: Jamie Downing; Jim Stevenson





FULL-SIZED PATTERNS

The full-sized pattern for the trees can be found on *page 72*

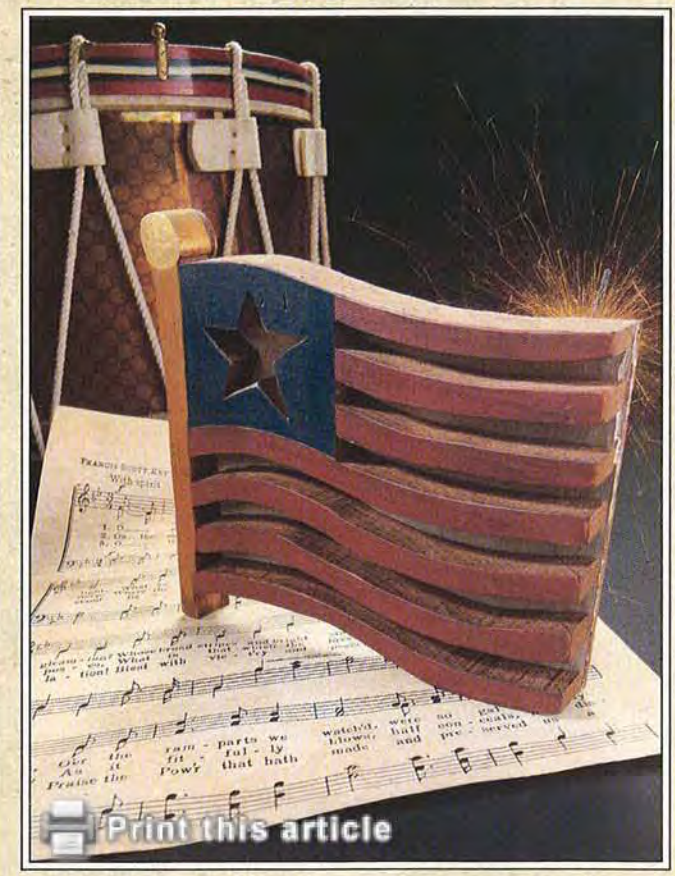
Pond cutout

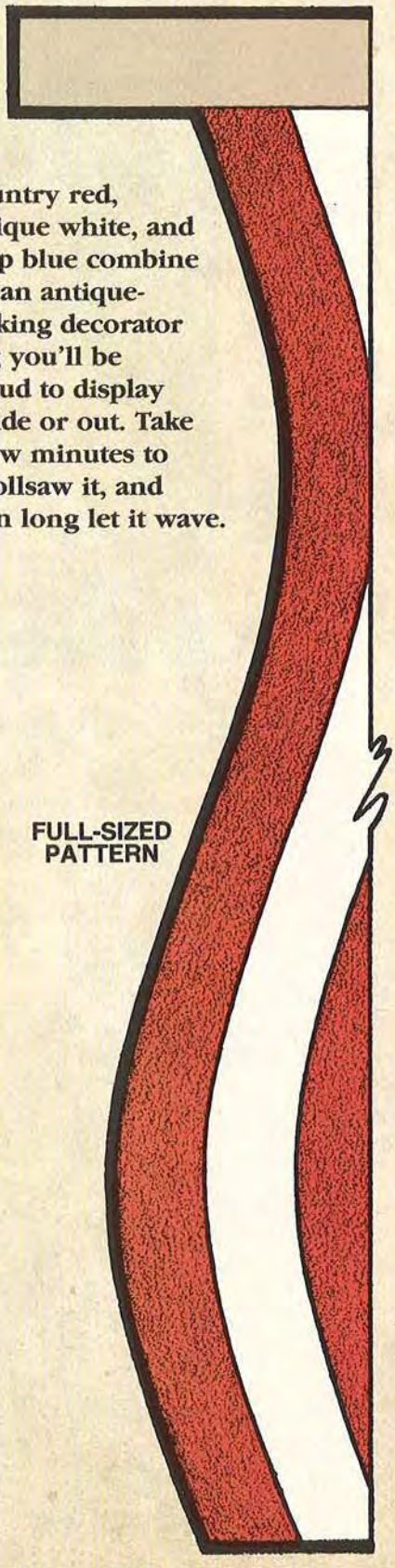
FULL-SIZED PATTERN

Cutting line, top piece

Cutting line, bottom piece

2⅝ × 7⅛" mirror cutout in bottom piece

IT'S A GRAND OLD

Country red, antique white, and deep blue combine for an antique-looking decorator flag you'll be proud to display inside or out. Take a few minutes to scrollsaw it, and then long let it wave.



***You'll need** 1×10×10" stock (we used pine) and a 10×10" piece of ¼" plywood.*

Attach a photocopy of the full-sized pattern, *right,* to a 10" length of 1×10 with rubber cement. Place the ends of the stripes at an end of the board.

Cut a piece of ¼" plywood to the size of your board. Temporarily attach it to the back of the 1×10 with double-faced tape. Scrollsaw or bandsaw the outside pattern line, and then remove the plywood piece and set it aside.

Drill a ⅛" blade-start hole through the board where shown on the pattern. Thread your scrollsaw blade through it (we used a #9 blade, .053×.018" with 11.5 teeth per inch), and cut out the star. Then, cut the stripes.

Sand the flag, putting a slight round-over on the top-face corners. Apply a coat of barn red to the stripes, but don't paint the edges or the flagpole. Paint the star field dark blue, and accent the ball atop the flagpole with gold. (We used artist's acrylics.)

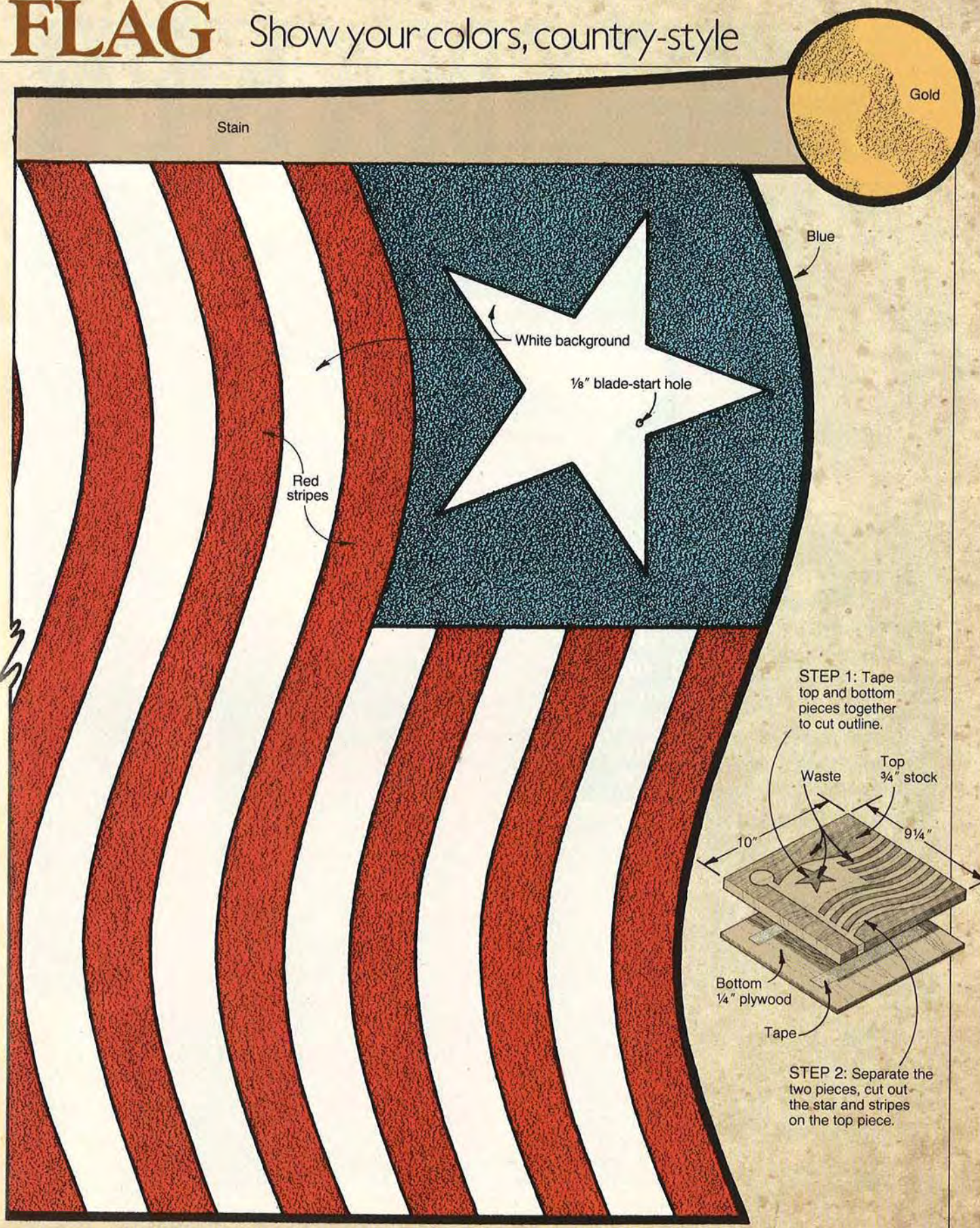
Paint the top face of the plywood flat white. (We mixed small amounts of brown and yellow with the white to get an aged-looking off-white.) Don't paint the plywood edges.

After the paint dries, scuff the flag corners with 150-grit sandpaper for an old, worn look. Brush walnut stain on the flagpole and all edges, including the edges of the plywood piece. Rub thinned walnut stain on the painted areas and quickly wipe it off to create an antique effect.

Attach the plywood to the flag with glue or brads. Then, add a wall hanger so you can proudly display Old Glory. If your flag will be going outside, coat it with a weatherproof clear finish.

Design: Harlequin Crafts Photograph: Hopkins Associates Illustrations: Jamie Downing; Jim Stevenson

FLAG Show your colors, country-style



SIMPLY STATED SHAKER

Like wall clocks built by the Shakers in the early 19th century, our version features clean, unadorned design lines. Although the Shakers frowned upon watches, wall clocks abounded. Today, collectors seek out the originals and pay dearly for them.

To build your own Shaker-style classic, use a solid panel in the door bottom. Or, for a more modern appearance and a view of the pendulum (something considered showy and therefore an unusual Shaker practice), try a glass insert.

Print this article

WALL CLOCK

Start with the cherry clock case

1 From ¾"-thick cherry, cut the sides (A) and the interior top and bottom (B) to the sizes listed in the Bill of Materials.

2 Cut or rout a ¾" rabbet ¼" deep across the ends and a ¼" rabbet ½" deep along back inside edge of both side pieces where shown on the Exploded View drawing. Then, form a ¼" rabbet ½" deep along the back edge of the top and bottom interior pieces.

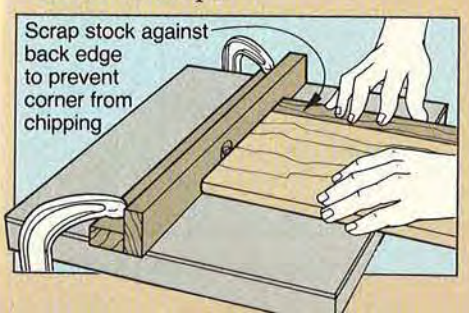
3 Glue and clamp the clock assembly (A, B), checking for square. Remove excess glue with a damp cloth.

4 Cut the exterior top and bottom pieces (C) to size.

5 Fit your table-mounted router with an edge-rounding bit (we used a Craftsman 9GT26337) and fence. Raise the bit where shown on the Routing detail accompanying the Exploded View drawing. Using the same detail for reference, position the fence and bit where shown. (We test-cut ¾" scrap stock first to verify that the routed cut was centered along the edge of the stock.)

6 Rout the front and side edges (not the back edge) of the exterior top and bottom pieces (C). When making the last cut (across the grain), use a piece of scrap stock to reduce splintering as shown on the drawing *below*.

7 Mark the ¾×4" notch on the back edge of the top exterior part (C) where shown on the Exploded View drawing. With a bandsaw or scrollsaw, cut the marked notch to shape.



It's time to add the cleats, clock face, support, and back

1 Cut the three cleats (D) to size. Glue and clamp them to the inside of the case where shown on the Exploded View drawing.

2 Cut the bottom cleat (E) and the clock-face panel (F) to size. Glue the bottom cleat to the front bottom edge of the clock-face panel, with the ends and bottom edges flush, where shown on the Exploded View drawing.

3 Place the clock face on the clock-face panel (F). Trace the shaft hole and four screw mounting holes from the clock-face openings onto the plywood panel. Remove the clock face and drill a ⅜" shaft hole where marked. Then, drill four 1/16" screw holes where marked.

4 Measure the opening and cut the back panel (G) to size from ¼" cherry plywood.

5 Transfer the full-sized half-round clock-support (H) outline and the three hole centerpoints to ¾" cherry. Bore a 1" hole where marked. Next, drill and countersink a pair of 5/32" shank holes where marked.

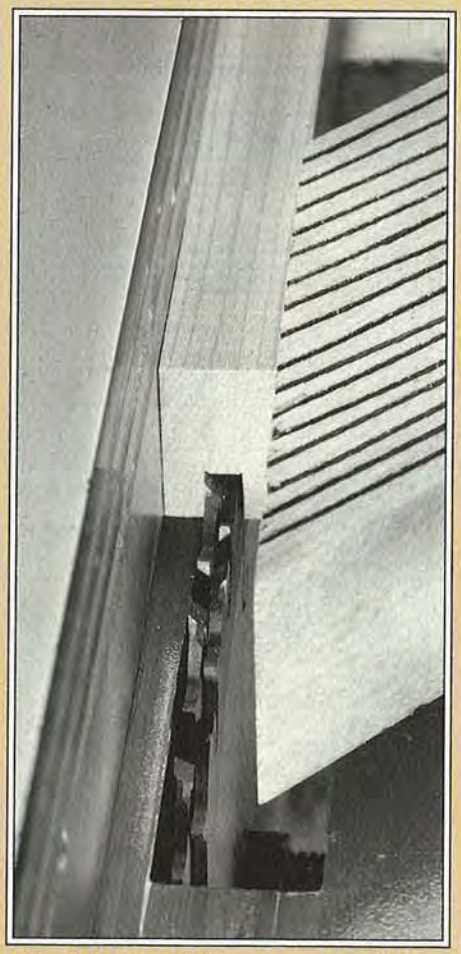
6 Cut the clock support to shape. Sand the radiused edge smooth to remove the saw marks.

7 Cut the clock support to shape. Glue the clock support into the notch in the exterior top piece (C). Then, using the previously drilled shank holes in the notch as guides, drill a pair of 7/64" pilot holes ¾" deep into the top piece (C). Drill the same sized mounting hole through the top interior piece (B) and into the support where shown on the Exploded View drawing and accompanying the Clock Support Mounting detail. Drive a trio of #8×1½" wood screws to further secure the clock support to the clock assembly.

Now, for the door

1 Cut the door stiles (I), top and bottom rails (J), and center rail (K) to size.

2 Fit your tablesaw with a ¼" dado set and cut a ¼" groove ⅜" deep centered along *one* edge of parts I and J and *both* edges of the center rail (K) as shown in the photo *below*. (Note that we used a feather board to keep the pieces firmly against the fence. We also test-cut scrap first to verify that the groove was accurately centered along the edge.)

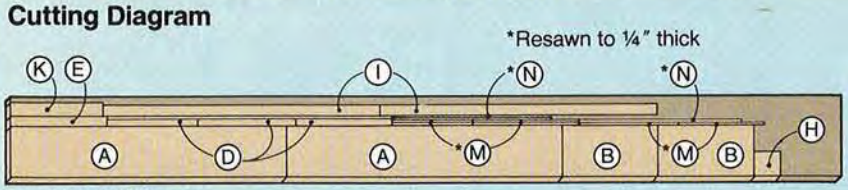


Cut a ¼" groove ⅜" deep centered along the door parts. Clamp a feather board securely to your saw table to hold the pieces firmly against the fence.

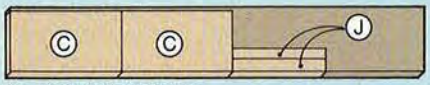
Continued

SHAKER WALL CLOCK

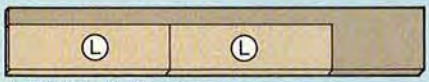
Cutting Diagram



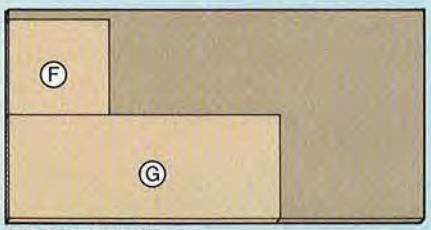
¾ × 9¼ × 96" Cherry



¾ × 7¼ × 48" Cherry



½ × 7¼ × 48" Cherry

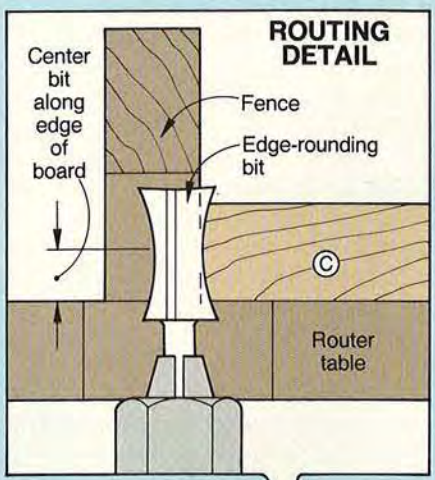


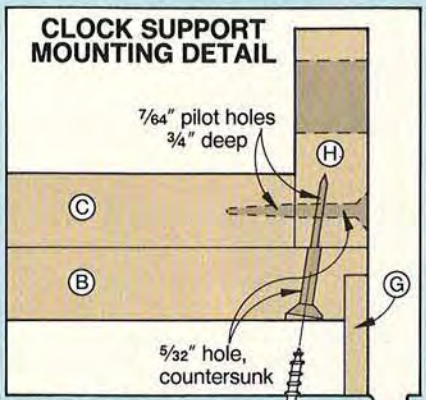
½ × 24 × 48" Cherry

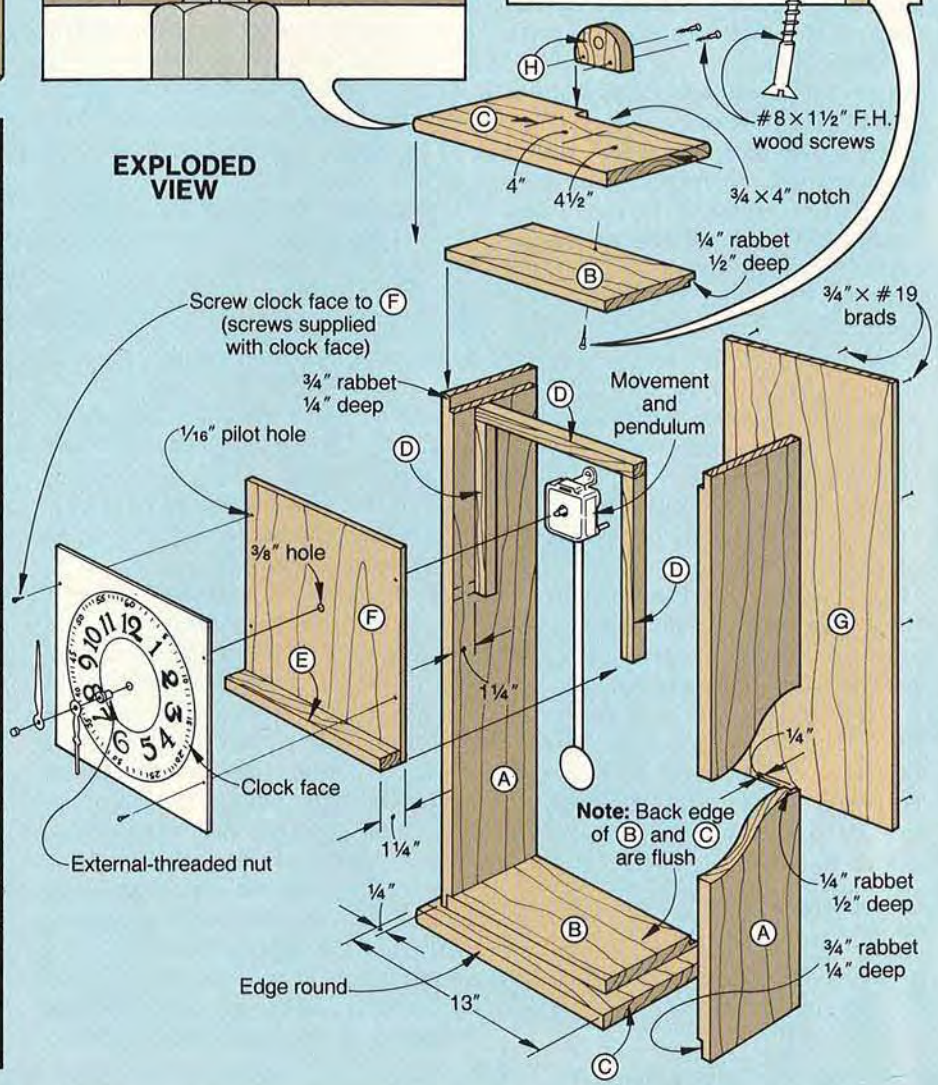
Bill of Materials

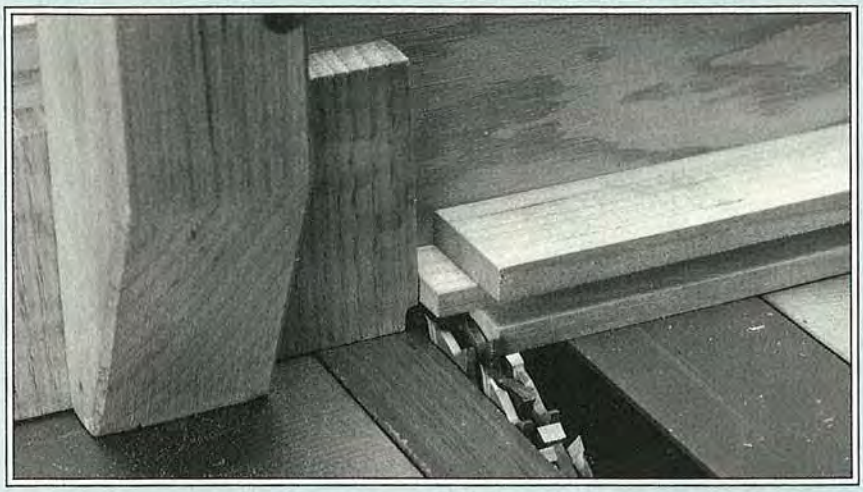
Part		Finished Size T	W	L	Matl.	Qty.
CLOCK CASE						
A	sides	¾"	6"	32"	C	2
B	top & bottom	¾"	6"	11½"	C	2
C	top & bottom	¾"	7⅛"	13"	C	2
D	cleats	¾"	¾"	11"	C	3
E	cleat	¾"	1"	11"	C	1
F	panel	¼"	11"	11¾"	CP	1
G	back panel	¼"	12"	31½"	CP	1
H	support	¾"	4"	2¾"	C	1
DOOR						
I	stiles	¾"	1¼"	31⅞"	C	2
J	rails	¾"	1¼"	10¾"	C	2
K	center rail	¾"	1½"	10¾"	C	1
L	panel	½"	10⅝"	18⁹⁄₁₆"	EC	1
M	stops	¼"	¼"	10¾"	C	4
N	stops	¼"	¼"	18⅝"	C	2

Material Key: C—cherry, CP—cherry plywood, EC—edge-joined cherry
Supplies: ½" × #19 brads, ¾" × #19 brads, #8 × 1½" flathead wood screws, ⅛ × 10¹¹⁄₁₆ × 10¹¹⁄₁₆" glass, clear finish.









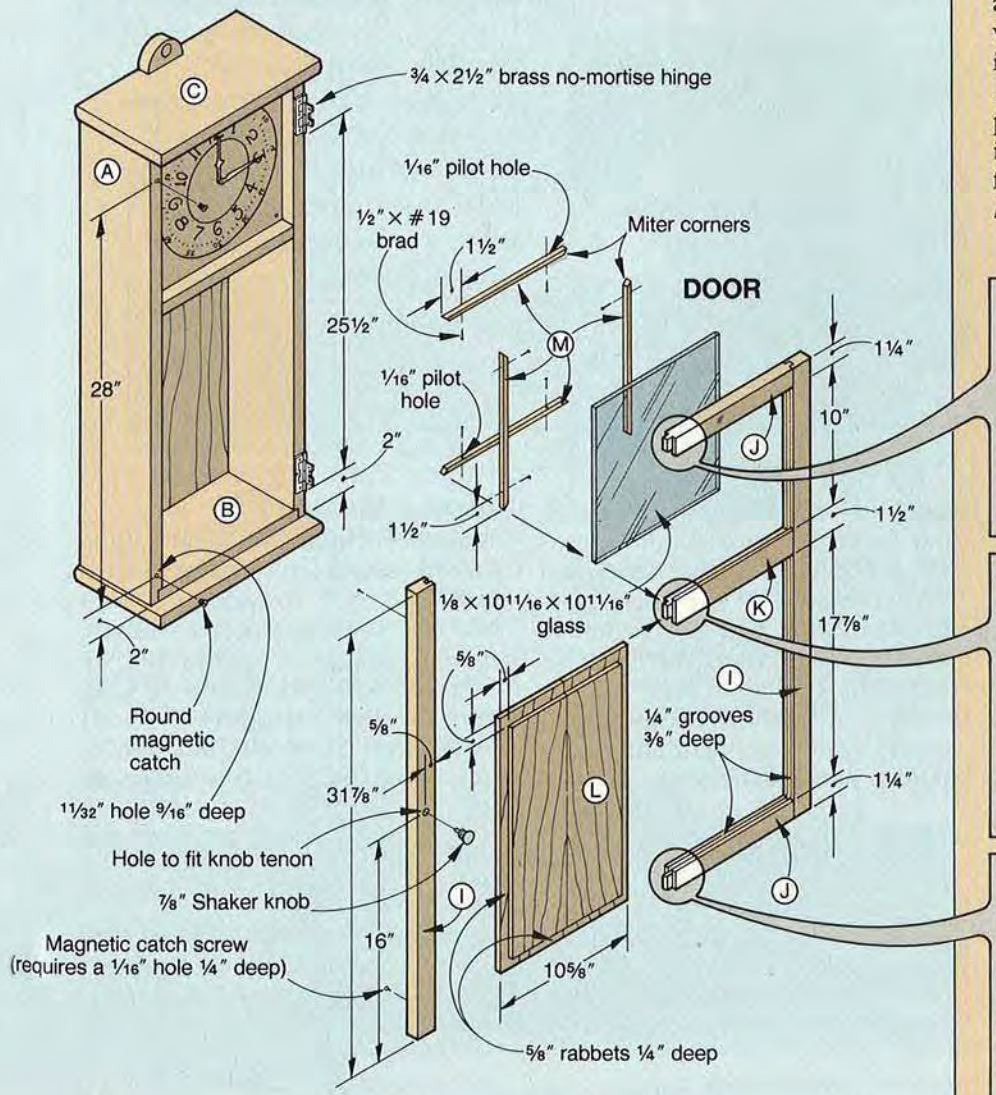
Cut a ¼" tenon ⅜" long across the ends of the rails. Clamp a stop to the miter-gauge fence for consistent tenon lengths.

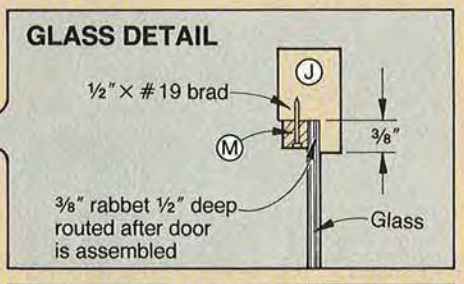
3 As shown in the photo at *left*, cut a ¼" tenon ⅜" long across the ends of the three rails (J, K). See the Tenon detail *below* for dimensions.

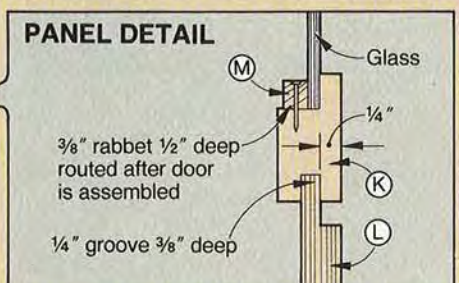
4 If you want to install the solid cherry panel (L) instead of a glass insert, cut two 5½×19" pieces of ½" stock (we planed ¾" stock to ½" thick). Edge-join the ½"-thick pieces, checking that the surfaces and ends are flush. Later, trim both ends and one edge to cut the edge-joined cherry panel to finished size. Sand the panel. Cut or rout a ⅝" rabbet ¼" deep along all front edges of the panel where shown on the Door drawing at *left*.

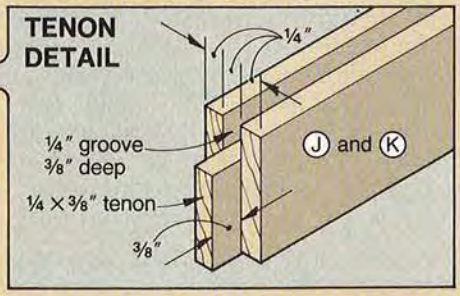
5 Glue and clamp the door pieces—including the door panel if you intend to use it—checking for square. See the Panel detail *below* for reference.

Continued









SHAKER WALL CLOCK

6 Fit your router with a ⅜" rabbeting bit. If you plan to fit both the upper and lower openings with glass, rout along the back inside edge of both openings in the door. See the Glass and Panel details accompanying the Door drawing and the Lower Glass Panel Installation drawings for reference.

7 Cut four glass stops (M) to size, miter-cutting the ends for the top opening. Cut the bottom opening glass stops (M, N) if required. Snip the head off a ½"×#19 brad, chuck the brad into your portable electric drill, and use the brad as a bit to drill pilot holes through the glass stops 1½" in from the ends where shown on the Door drawing.

8 Drill the holes for the knob and magnetic catches. Glue the knob in place.

Add the finish, hardware, and movement

1 Stain and/or finish the case, door, back panel, knob, and glass stops as desired. (We left ours unstained and applied three coats of satin polyurethane.)

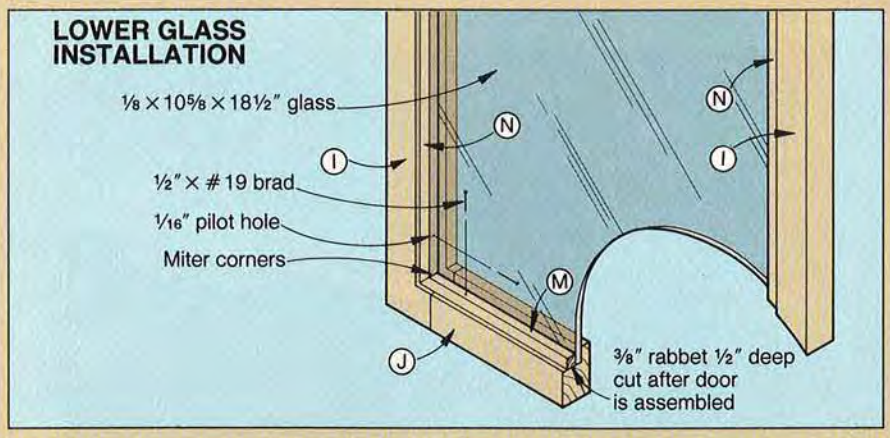
2 Install the glass and the glass stops. See the Glass detail accompanying the Door drawing for reference. Screw the clock face to the plywood panel (F).

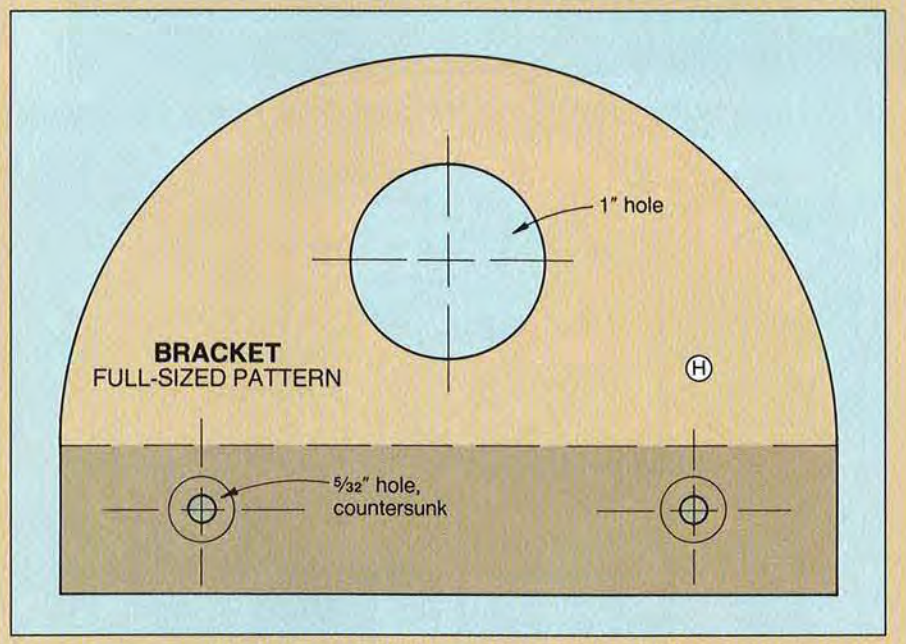
3 Attach the hinges to the front edge of the right-hand side piece (A) where shown on the Door drawing. Then, fasten the hinges to the door stile. When positioning the door for attaching the hinges, allow 1/16" gap between the clock case and the top and bottom of the door.

4 Insert the magnetic catches into the previously drilled holes, and mark their mating locations on the back face of the door stile. Drill a pair of mounting holes in the back face of the door, and drive the screws, which act as strike plates.

5 Brad the back panel (G) into the rabbet in the clock back.

6 Stick the clock shaft through the hole in the plywood panel, and fasten the movement (minus the pendulum) to the panel and clockface with the external-threaded nut. Add the hands to the clock shaft. Hang the clock on the wall (or a Shaker peg as shown in the opening photograph). Add the pendulum and battery, and set the time.





Buying Guide

• **Shaker clock kit.** Quartz pendulum movement, Shaker hands and dial, ⅞" Shaker peg, two ¾×2½" brass no-mortise hinges, two 5/16" magnetic catches. Kit No. A0510X, $55 ppd. Mason & Sullivan Co., 586 Higgins Crowell Road, West Yarmouth, MA 02673, or call 800/933-3010 to order.

WANT TO LEARN MORE ABOUT SHAKER CRAFTSMANSHIP?

For an insight into the austere lives of the Shakers, their craftsmanship aimed at function not fancy, and their furniture, we'd like to recommend *The Book of Shaker Furniture* by John Kassay, The University of Massachusetts Press, Amherst.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry

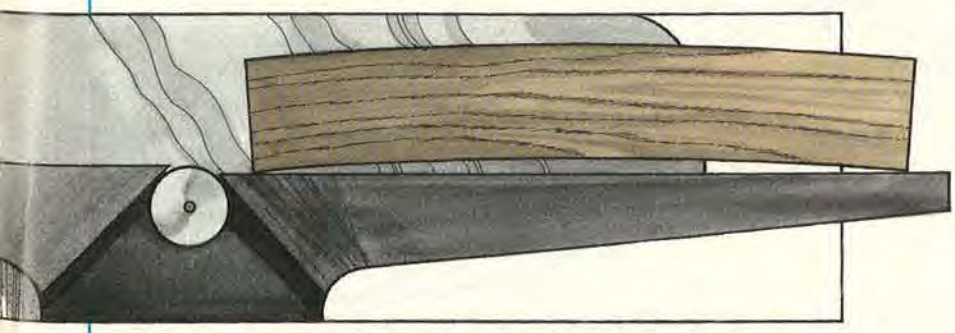
Print this article

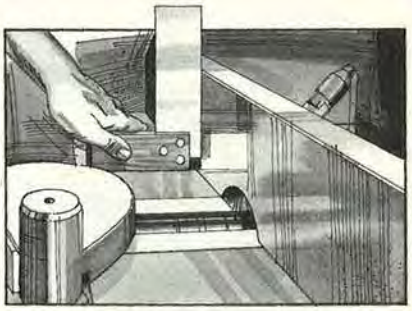
A tried-and-true method for SQUARING UP STOCK

Despite its gracefully rounded final shape, a cabriole leg must begin with an absolutely square length of wood. That means each face is the same width and forms a 90° angle with adjacent faces. In the cabriole-leg example, a not-quite-square workpiece will yield a slightly distorted leg that's different from the other table or chair legs, even when shaped from the same pattern.

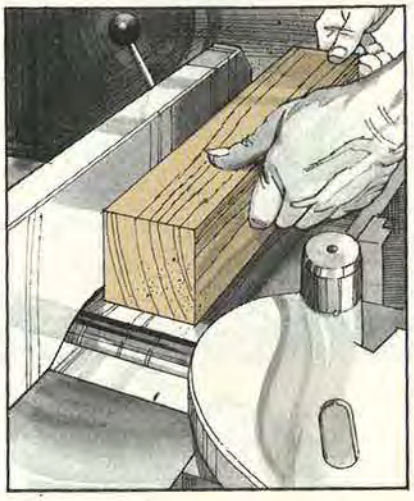
Likewise, square tapered legs, and turned legs with square sections, need to start with squared stock. Here's how to perform this simple—but essential—squaring process, using your jointer and tablesaw.

1 Place the workpiece on a flat surface, such as a saw table, to detect any warp. If the workpiece is bowed, place the hollow side of the bow on your jointer as shown *below*. If you can't detect a bow, place any side onto the jointer. Pass the workpiece over the jointer until you have a true, flat surface. In this and the following steps, remove only as much stock as is necessary to true the surface.

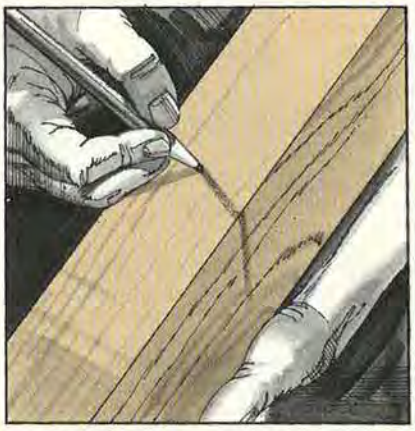




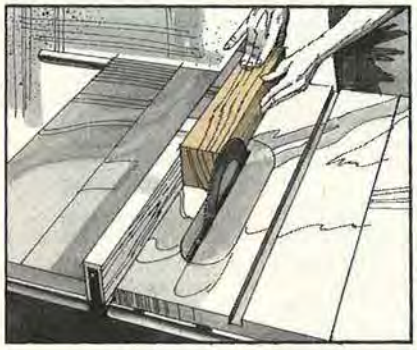
2 Set a try square on the outfeed table of your jointer, and carefully adjust the fence to exactly 90°.



3 Place the trued surface from Step 1 against the jointer fence as shown *above,* and true the adjacent bottom face of the workpiece. Feed the stock slowly for best results.



4 With your try square, check the two trued surfaces to make sure that they're at 90° to one another along the entire length of the workpiece. Mark these two surfaces as shown *above* so you don't confuse them with the untrued surfaces.



5 Fully raise your tablesaw blade, and check it and the saw's fence for square. Lower the blade so it's ⅛" higher than the workpiece. Hold either trued surface of the workpiece against the fence with the other trued face against the table. Now, adjust the fence for a "skimming" cut. This means that the blade will remove a minimum amount of material and still cut the entire surface. Pass both untrued surfaces through the blade as shown *above.*

Illustrations: Kim Downing; Jim Stevenson

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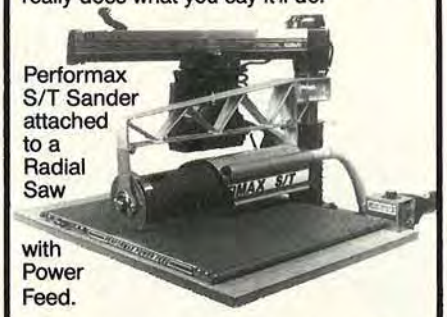

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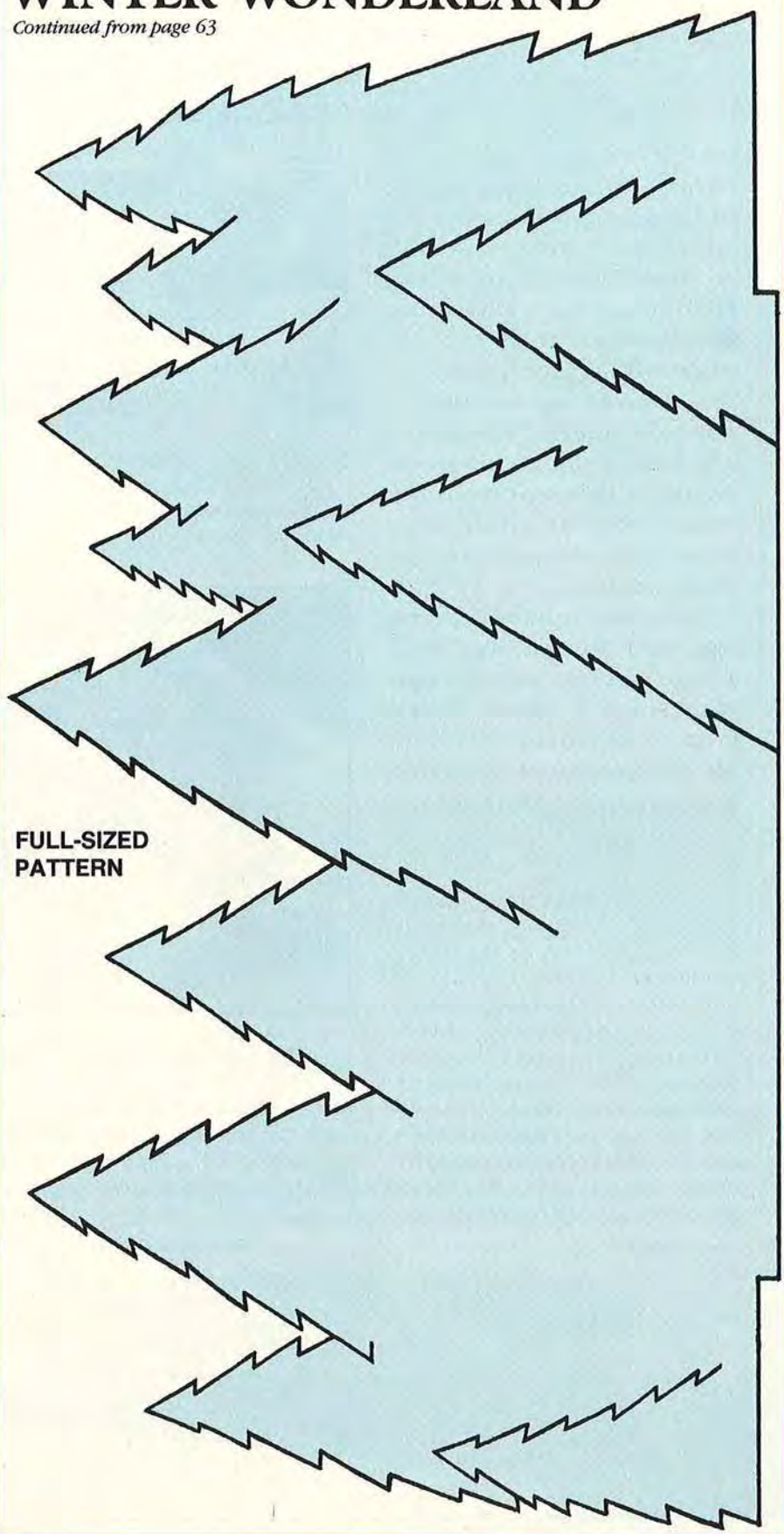
WINTER WONDERLAND

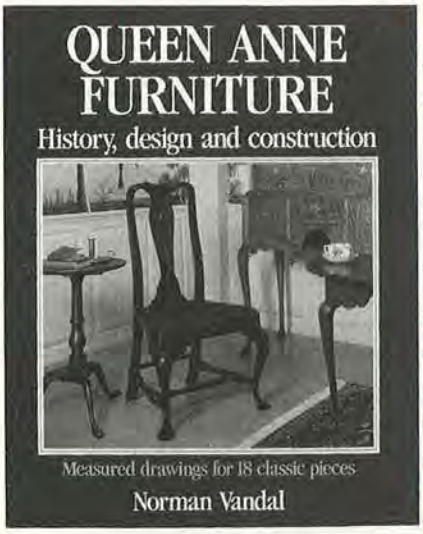
Continued from page 63



FULL-SIZED PATTERN

QUEEN ANNE FURNITURE

History, design, and construction



By Norman Vandal
The Taunton Press Inc.
63 South Main Street, Box 5506
Newtown, CT 06470-5506 © 1990
247 pages, $34.95 hardcover

"Queen Anne never sat in a 'Queen Anne' chair, nor did she store her clothing in a high-boy named after herself. The Queen Anne period was not identified as such until at least 150 years after Anne's death. Even then, the term was coined not on her native soil but in North America."

Even if you never build any of the Queen Anne-style furniture presented in this book, it's a worthwhile investment. The historical data and descriptions of individual furniture pieces presented by author Norman Vandal will delight the armchair enthusiast and provide collectors with first-hand knowledge of this classical furniture style.

Seeing a need to consolidate Queen Anne historical data, accurate measured drawings, and information on both period and modern construction technology in a single source, Vandal has written what his publisher calls "the most comprehensive book ever published on this most popular and sophisticated of American furniture styles."

Following a historical overview of Queen Anne furniture, the author describes the various styles of cabriole legs, and provides detailed instructions on bandsawing and turning several styles of this smooth-flowing leg.

Then, Vandal, who's spent 15 years reproducing period furniture, plunges into seating, tables, and case furniture. If you're interested in building a piece or two, you'll enjoy the 18 pieces of furniture described with numerous color and black and white photos, 81 pages of detailed measured drawings, how-to procedural drawings, and extensive copy coverage of the construction and finishing procedures. In addition, Vandal lists sources for the necessary hardware, tools, finishes, and upholstery supplies.

To present the projects, Vandal relies on front, side, and section-view drawings. An inclusion of an exploded view of each project and full-sized drawings of some of the smaller parts would have been most helpful. As shown, I believe most intermediate woodworkers could complete the simpler furniture pieces, but not the more detailed ones.

Projects range in complexity from a basic oval-top table to a more complex scallop-topped chest. Turners will want to take a stab at the tilt-top candlestand or the Hudson River Valley side chair.

Reviewed by Marlen Kemmet,
How-to Editor

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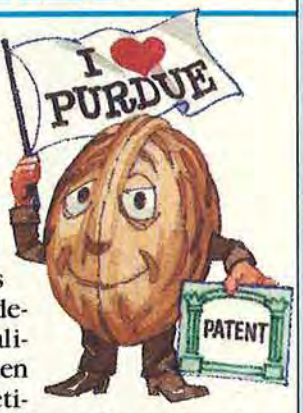

A genetically improved black walnut developed at Purdue University received the first U.S. patent ever awarded to a tree. Named Purdue No. 1, the tree was patented in 1980 after more than 20 years of research.

The improved walnut strain grows twice as fast as normal walnut trees, possesses exceptionally straight trunks, and produces a crop of nuts every year instead of every other year. Walter Beinke, an associate professor of forest genetics at the Indiana school, and other researchers originally obtained grafts from selected wild trees chosen for desirable qualities. They then grew genetically improved seedlings from the next generation.

Since its availability, many tree farmers have adopted the Purdue No. 1 for investment plantings on their property. For more information on these trees, and prices, contact *Indiana Walnut Products, Inc., 1000 North 500 West, W. Lafayette, IN 47906.*

CARICATURE CARVERS UNITE

What's the connecting thread between Desiree Hajney's wildlife carvings, Harold Enlow's wooden Ozark hillbillies, and Harley Refsal's quaint basswood farmers? These noted carvers, and many others, specialize in caricature—the art of exaggeration—to make their work humorously memorable.

To promote interest in caricature carving and to elevate it to a higher level of public esteem, these three carvers and a dozen others from across the U.S. have founded the Caricature Carvers of America. Watch for seminars, exhibitions, and competitions in this aspect of carving. For information on the organization, write: *Dave Dunham, corresponding secretary, Caricature Carvers of America, 301 North Ridgeway, Cleburne, TX 76031.*

AIMING HIGH TO SAVE A TREE

Forest Service volunteers in California's Plumas National Forest qualify as deadeyes. That's because they collect cones of the sugar pines with rifles—shooting them from the treetops before they open and scatter their contents.

Researchers test the seeds contained in the cones for resistance to blister rust. Then, the disease-resistant seeds are planted in reforestation efforts to guarantee the sugar pine's future.

Illustration: Jim Stevenson Photo: Mike Pattison

Former pro golfer Barry Kerr sands off the head on one of his handcrafted wood drivers.

BORN-AGAIN WOODS

Just a long tee shot from the first hole at Scotland's legendary St. Andrews Golf Club, all-wood clubs are undergoing a revival. Four years ago, Barry Kerr, a former professional golfer, traded his putter for a draw knife and founded the Hickory Stick Golf Company. He now turns out reproductions of the clubs used by 19th-century masters.

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Golf fans just love Barry's work. He ships his reproductions around the world.

For details on Barry's handmade wood clubs, write: *Hickory Stick Golf Company, 4 Church Square, St. Andrews, Fife, Scotland KY16 9NN.*

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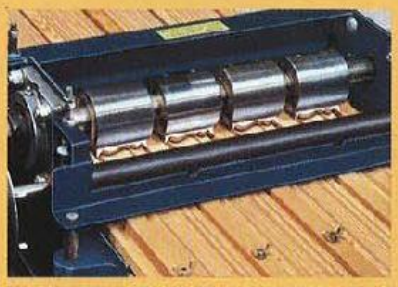

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